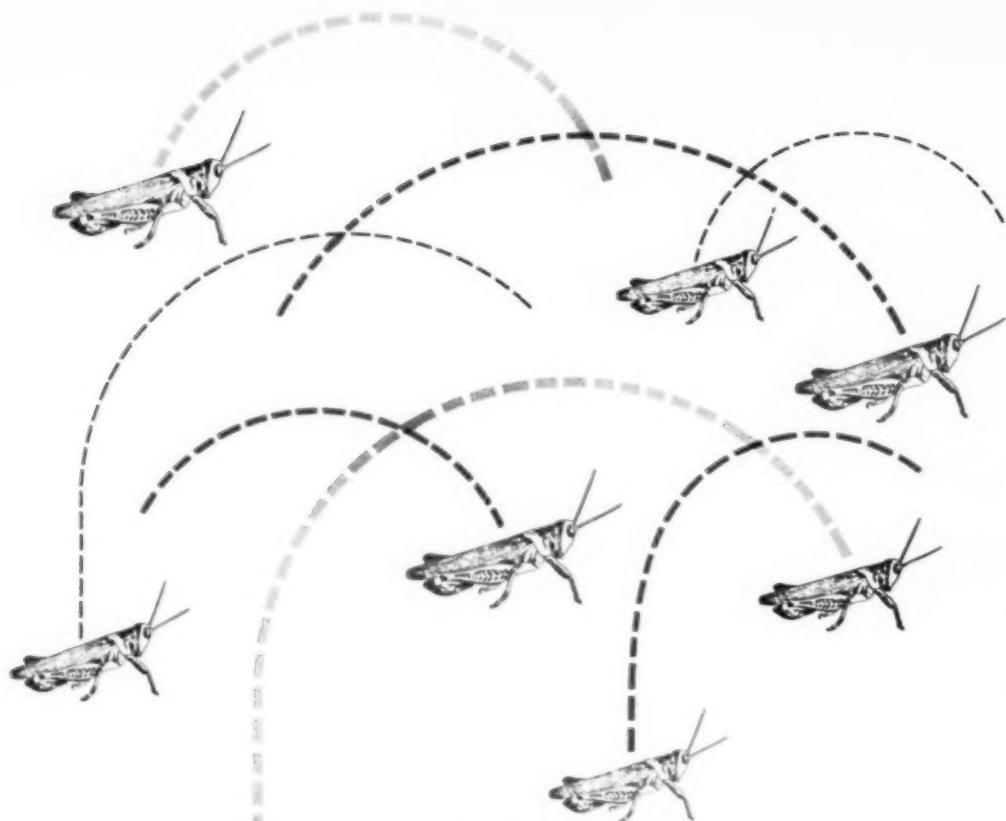


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THIS MONTH'S COVER

Checking samples of pesticides against label claims is part of the U. S. Department of Agriculture's job of enforcing regulations. Here, a U.S.D.A. chemist determines the composition of a product . . . chances are that it will meet specifications. (See article on page 26) U.S.D.A. Photo.

JULY

1950

VOL. V

No. 7

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AGRICULTURAL CHEMICALS

Subscription Rates: One year, United States, \$3.00; Canada and Pan American countries, \$4.00; Foreign, \$5.00. Published monthly on the 15th by Industry Publications, Inc. Wayne E. Dorland, President; Ira P. MacNair, Secretary-Treasurer. Publication office, 123 Market Place, Baltimore 2, Md. Advertising and editorial office 254 W. 31st St., New York 1, New York. Advertising rates made known on application. Closing date for copy—20th of the month previous to date of issue.

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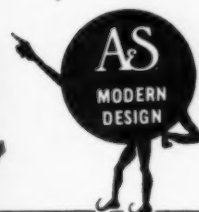
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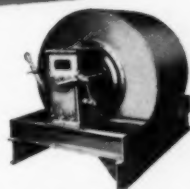
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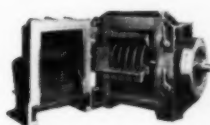
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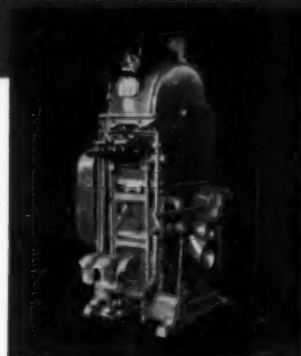
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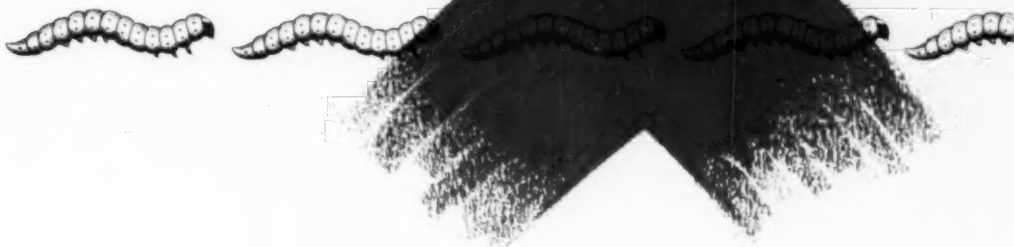
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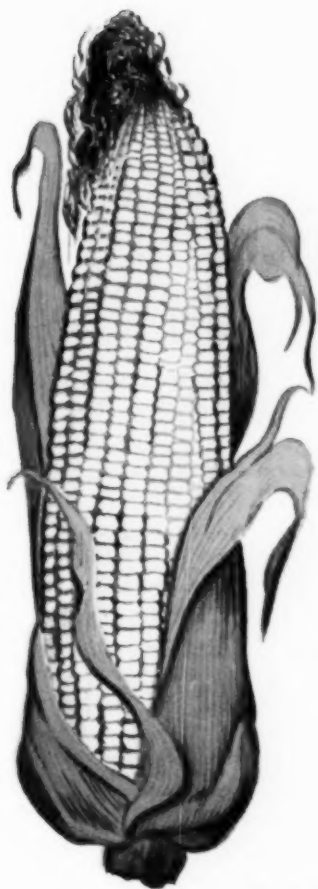
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THE EDITOR COMMENTS

WITH the introduction of so many new compounds in the pesticide field, a renewed emphasis on safety has become a necessity. While practically all plants, large and small, have made a real effort to protect workers from fumes, spillage, of chemicals and other hazards, records of the Safety Research Institute, New York, indicate that the frequency and severity of accidents in small plants are roughly double the rates for larger plants. The smaller the plant, the higher the accident rate.

G. E. Johnson, assistant chief of the Division of Industrial Safety of the State of California points out that although the small plant owner may be unable to afford a safety engineer, he cannot afford to be without a safety program. The financial implications are rather obvious, we think, since one bad accident in a little plant might wipe out the profit of several years.

In the pesticide field, however, the matter of safety extends far beyond the manufacturing plant, since those who handle the product subsequently are in many cases exposed to its hazards. That every effort has been made to reduce such hazards, is seen frequently. One outstanding example is that of American Cyanamid Co., manufacturer of parathion, which has published pamphlets and bulletins by the thousands, distributing them to dealers, distributors and users of the toxicant. Special technical bulletins have also been distributed to physicians to brief them on symptoms and antidotes.

Safety in the use of toxicants is largely up to the individual, however. In the case of manufacturers and formulators, masks and other devices are provided workers for their protection. The same is true all down the line. But where familiarity breeds contempt, it is essential to keep hammering the safety theme, even though it may at times seem too repetitious. As Mr. Johnson stated, "Safety-mindedness is achieved only by the constant attention to safety in every phase of the day's work."

RECENT meetings of the two major fertilizer associations, as well as gatherings of state and local groups, have emphasized one common theme: that of the large-scale fertilization of pasture lands in the U.S. With a constant trend toward smaller acreages under the government allocation policies, the added attention to fertilizer use on pasture land is of tremendous significance to the fertilizer industry.

W. R. Thompson of Mississippi, one of the nation's foremost exponents of the use of fertilizer for richer pastures, says that a minimum of 108½ million tons of mixed fertilizer is needed by American farmers on pasture lands alone. His insistence upon using enough plant food to get results, is logical from both the scientific and economic standpoints. Skippy application of plant food can disappoint the grower with poor results, and make him feel that the idea is but a selling scheme. On the contrary, generous applications result in enthusiastic reactions on the part of growers, resulting in more consistent fertilizer sales.

It would thus seem logical for fertilizer salesmen to adopt Mr. Thompson's method of assuring the farmer of from five to nine dollars profit for every dollar invested in fertilizer for pasture land. He says it is a sure-fire argument, and if it is, fertilizer sales forces should grab it up without delay. If the grass looks greener on the other side of the fence, it is probably because the fellow over there is using more fertilizer!

AN editorial pat on the back seems to be due the NFA for its establishment of a new educational and research foundation. That the entire fertilizer industry has a stake in such a venture is obvious, since much of the business of the future depends upon how efficiently today's information reaches the farmer. It is to the interest of all fertilizer sellers to support such educational efforts.

ARE some of the highly effective new poisons too dangerous for use under any circumstances? An unequivocal answer to that question is being sought by many conscientious groups associated with either the safe-guarding of public health, the protection of the world's food supply, or the manufacturing or control of the chemicals themselves.

An answer definite as desired may never be given, but in studying the entire problem, all phases of poison use must be kept in mind. The effectiveness of some of the more toxic agents in protecting human beings and property against rodent- and insect-borne disease or serious economic

All-Inclusive Study

ECONOMIC poisons include all those products—new or old—which have been proved to have value in the fight against insect, rodent, fungus, weed and associated pests. Of course, not all of the substances in this category are equally dangerous to handle, and it is encouraging to note that there is one distinct trend in current research aimed at the development of safer and more specific agents. Considerable progress has been made, and it is safe to prophesy that this line of research will receive a great deal more attention as new and worthy leads are uncovered. Since materials of low hazard are not under

gamma isomer of benzene hexachloride, tetraethyl pyrophosphate, parathion, alphanaphthylthiourea and sodium fluoroacetate will serve to indicate the many problems which will have to be solved before some of these products will deserve to become as commonplace as the older materials which they are supplanting.

Perhaps the most important thing about the newer poisons is that they started appearing at the time when unique methods in the control of pests were badly needed, in order that there might be more food for people in many parts of the world, as well as more protection of troops and civilians against insect- or rodent-

New Hazards From New Economic Poisons

damage, should be judged carefully with relation to the extent of hazard which may be associated with using such materials.

The warfare against pests is of course a critical and continuing one, and it must be waged aggressively and effectively. Success in such a war, however, depends both on the available weapons and on the ability of the users to handle them. Currently it would seem that the trends in economic poison development are paralleling those which are being seen in most other phases of modern life. It should not come as a surprise to find highly toxic chemicals becoming available for pest control in an age when man is learning to live with sleeping tablets and other useful but dangerous drugs, illuminating gas, electricity, firearms and commercial explosives, automobiles and airplanes, as well as other intriguing but potentially hazardous gadgets.

scrutiny in this discussion, they may be dismissed with the comment that the aim of pest control research is to find effective, economical, synthetic products which will control pests without endangering many useful insects, animals or plants. As such materials become available and as they prove their relative effectiveness, problems associated with the more potent poisons will be less serious than they are at present.

As has been demonstrated within the past year, there are a number of new materials which are under scrutiny because of well-known or recently discovered hazards. Among these are some which are not highly toxic, while others are known to be dangerous. No attempt will be made to cover the list, but a few materials will be chosen at random to illustrate the point. A brief mention of DDT, dichloro diphenyl dichloroethane, methoxychlor, chlordane, toxaphene,

borne disease. Older products in many places were becoming less satisfactory against insects and rodents, and intensive efforts to improve results by modification of the older methods were failing. When it is realized that war-produced shortages of the better-known poisons were added to this situation, it is easy to justify the early enthusiasm with which the discoveries of such compounds as DDT, alphanaphthylthiourea (ANTU), and sodium fluoroacetate (Compound 1080) were hailed by entomologists and economic mammalogists, respectively. Early in the history of DDT, its exceptional value for the control of many types of insects, and its practical uselessness against others, were discovered. When this idiosyncrasy was announced, grave concern was expressed over the "disturbance of nature's balance which would follow widespread use of DDT." Such apprehension appears

to have been partly justified, since indiscriminate use of DDT insecticides may be very injurious to certain parasites that would ordinarily be useful in reducing the abundance of certain insect pests. For a while it seemed that DDT might well become specific for house pests, such as bedbugs, flies, and mosquitoes, just because it was too "tricky" to use on field or garden crop pests. But this did not happen to DDT, because of several factors which included a better understanding of the use of this insecticide. The facts are, DDT swept into general popularity and widespread use, just as fast as it was made available, in complete disregard

hand, it has been established with reasonable certainty that DDT, when handled according to precise directions, can be used widely without causing the disaster which some people feared.

The phenomenal general success of DDT on many insects, and its signal failure on others, challenged the chemists to search for related substances which would be better. Large numbers of chemicals were synthesized and these materials were tested. Some of the DDT substitutes proved to be more toxic than DDT, while at least two were found to have hazards which were less acute. So far, no chlorinated hydrocarbon of this group has been found to be "highly toxic" under the definition in the regulations established for the enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, although one or two come rather close to the line.

It might be well to explain, however, that the category of "economic poisons highly toxic to man" is based on bioassay determinations carried out on mice, rats and rabbits, and is designed to determine the specific hazards associated with handling the formulations as they reach the final purchaser. The use of these three species of test animals is on a sound legal basis, but it is well to remember that there are other factors involved in the problem.

It is becoming necessary more and more to limit all conclusions to the exact species on which the tests are run. When an economic poison such as ANTU, which is so selective that it will kill one form of rat 30 to 40 times as easily as it kills another, is under study, and it is obvious that one should not try to forecast the toxicity to other animals from the lethal dose determined on either form of rat. This may be an extreme example, but it proves the point. In addition, just to make the whole evaluation problem more complex, the variability in acute toxicity between samples of some of the new poisons is both inexplicable and marked.

As we suggested in our comments on the term "highly toxic," there is another complication to plague the pharmacologist. Each for-

mulation is an individual problem. The so-called "inert" ingredients, such as carriers, solvents, or diluents, vary widely in the effect which they exert on the active substances. This means that each different mixture must be judged on its own merits—not on the percentage of any single ingredient in the formula.

Burden on Industry

ALL these problems place a great deal of extra responsibility on both the manufacturer and governmental control laboratories; it puts a direct obligation on the producer of a poison to know just what his particular formula will do both from the effectiveness angle and from a hazard viewpoint. It forces the Government laboratory to undertake enough testing of formulations to learn just how far an individual type of treatment will have to be carried, in order to make regulatory action both adequate to protect the public, and fair to the manufacturer. Such a program is an ambitious one, and will require a great deal of detailed study. However, much of the work must be carried out by the manufacturer and the results of his tests, as well as the guaranteed percentages of active principles, used as the basis for his claims.

While some of the chlorinated hydrocarbons have many characteristics which must be disclosed before their use can be approved without reservations, this particular chemical group is not unique among the newer poisons. In fact, tetraethyl pyrophosphate, parathion, and Compound 1080, each has its peculiar complication. The potential danger from these three new economic poisons should not be ignored nor minimized. Tetraethyl pyrophosphate and parathion (O, O-diethyl O-p-nitrophenyl thiophosphate) are extremely toxic by skin absorption. These poisons will kill mice and rats with such small amounts of the commercial grade chemicals that the doses cannot be measured accurately with the smallest hypodermic syringes. If the same degree of susceptibility as is shown in mice, would be true for man, a good, full drop of the heavy liquid would

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by

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of the few words of warning which were being sounded. Concurrently, the question of hazard to mammals from exposure to this new poison became a matter of primary concern to many agencies, not only from the viewpoint of possible danger from large doses, but also from chronic injury due to repeated small ones. A number of laboratories have worked on this problem and much has been learned. The complexity of the studies required for complete evaluation of a compound, however, is shown by the fact that all the work which has been put on DDT alone, has failed to answer several important questions. This has been emphasized more vividly within the past months when the withdrawal of DDT from use on dairy animals, in dairy barns, or on livestock being finished for slaughter, has followed the release of new research data on accumulation of this "poison" in fat. On the other



*Many Pesticides Come
Under Scrutiny of USDA*

INSPECTION

HOW does the enforcement procedure of the U. S. Department of Agriculture operate in carrying out the regulations of the Act of 1947? Since the bulk of manufacturers of insecticides, fungicides, weed killers and rodenticides have never run afoul of the rules, many of them may not be acquainted with the way in which various materials are tested to be sure they meet specifications and that the performance of the product lives up to the claims made on the label.

The U.S.D.A. pictures presented here give a birds-eye view of the activities of the division, and the thoroughness with which the work is done.

Above, left, sealing a bottle of insecticide material which has been selected from a retail store shelf. The sample will be analyzed and tested by the U.S.D.A., as is shown in subsequent pictures. Samples are obtained from all parts of the nation.

Left: Dr. T. H. Harris, chemist, determines the composition of a product to compare with label claims. This work also furnishes a basis for further laboratory tests to determine if label claims for use are accurate.

Below: This is the termite graveyard. Richard White, entomologist, examines a board treated with termite-proofing material to determine its effectiveness. Treated boards are buried in the ground and are inspected periodically.



SERVICE

Right (above) Paul Lung, entomologist, inspects the results of tests using a commercial insecticide to combat Mexican bean beetle. Damage done to the bean leaves is obvious, which means that although material was used according to label instructions, it failed to do the job. In this case, the manufacturer will be required to correct his formula to reduce the product's phytotoxicity.

Right: Checking the effectiveness of commercial herbicides is part of the work of the inspection service. Do the results on specific weeds come up to claims made on the label? Dr. William E. Chappel, agronomist, is checking the effectiveness of a commercial weed killer used on a grass plot. The weeds remaining on treated and untreated plots are counted by means of a point quadrant.

Below: The nerve center of the inspection service in the Dept. of Agriculture building in Washington. In this room are stored more than 27,000 registrations of economic poisons under the Act of 1947. In the center, Dr. W. G. Reed (left), Insecticide Division Chief, and Dr. E. L. Griffin, assistant chief, examine a registration. Other division personnel in the photo are processing applications for registration and checking records for possible violations.



NFA

Observes Fertilizer Industry's Centennial at Greenbrier

WITH the largest attendance in the group's history, the National Fertilizer Association held its 25th annual convention at the Greenbrier Hotel, White Sulphur Springs, W. Va., June 12-14. Nearly 700 persons were on hand to hear panel discussions on current problems, addresses by Russell Coleman, NFA president and Ray L. King, chairman of the board; and talks by Hon. Allen J. Ellender, U. S. Senator from Louisiana; Robert M. Salter, Chief of the U.S.D.A. Bureau of Plant Industry, Soils and Agricultural Engineering; Paul D. Sanders, editor, *The Southern Planter*, Richmond, Va.; and Dr. Ralph Robey chief economist, National Association of Manufacturers, New York.

Although the general theme of the convention centered around an observance of the industry's hundredth anniversary, other subjects covered included the role of Government in agriculture; the grassland farming trend and an analysis of the present

economic situation as it affects business in general.

In his talk on Wednesday morning Dr. Coleman presented facts and

D. S. Murph to Retire

Daniel S. Murph, secretary of the NFA, will retire August 1, it was announced at the June meeting by Ray L. King. Mr. Murph has been with the Association for fifteen years, following a distinguished legal career in the South.

As a gesture of appreciation, the Association presented him with a new desk for his use at home.

No successor for Mr. Murph was named at the meeting.

figures to point out how the United States has progressed during the past hundred years, contrasting the system of free enterprise with the negative philosophy of Marx and others whose teachings would destroy initiative. "Isn't a hundred years long enough to convince our people that private industry is a vital and essential part

of American government? Isn't it long enough to convince government that its proper place is to regulate and govern, not to dictate and control business; that even good government can not substitute for self-government? Isn't a hundred years long enough to convince labor that its interests are best served where profits are not only high enough to provide for good wages, but are also great enough to allow a constant investment in better tools? Isn't it long enough to convince capital that it has a continuing responsibility of improving its products and providing better facilities for its employees?" he asked.

The NFA head also hit at the organic farming cult, referring to them as a group of "test-tube gardeners who consider inorganic fertilizers unnatural and detrimental to soil and man. . . . Nothing is more ridiculous," he declared. "The chemical products used in fertilizers are taken from nature's storehouse and processed by man, just as automobiles are made



Cutting the Centennial Birthday cake at the annual banquet June 13 was a highlight of entire convention. Here Mrs. Ray L. King, wife of the NFA board chairman, cuts the first slice and places it on plate held by Dr. Russell Coleman, president of the Association. Cake was made especially for the occasion, complete with one hundred lighted candles.



from processed iron ore and other natural products." He continued by pointing out that our soils are producing more today than ever before, and that in the past half-century, the life-expectancy of people in the U. S. has increased by 20 years . . . and at the same time, the use of commercial fertilizers has doubled and redoubled.

"This pseudo-religious cult claims that an increase in cancer and heart disease is a result of the use of chemicals," Dr. Coleman stated. "The fact is," he continued, "that only in the last 50 years have people lived long enough to be subject to old-age diseases."

Three questions must be answered before the fertilizer industry can make its maximum contribution to agriculture, Dr. Coleman declared. These are: to what extent are sound fertilizer practices being followed; what is the potential market in various regions on different crops; and how can the farmer be reached with additional information?

Senator Allen J. Ellender, Louisiana, paid tribute to the role of chemicals in agricultural production, in his talk on Wednesday morning, and made a strong plea for an early termination of farm price supports in

order to allow "the gradual return to a system that permits the price of farm products to be set by a free competitive market." The Senator pointed out that through consistent efforts to maintain soil fertility and conservation in the U. S., today's population of some 150,000,000 are eating 10% more per capita than did 130,000,000 Americans before World War I. As an example he reminded that in 1900 some 395,000 tons of plant food were applied to the nation's soil; whereas in 1949 the

amount ran into millions of tons. In 1900, there were but 400 lime spreaders in the entire country, he said, indicating the lack of materials and know-how in agricultural science in those days.

The toll of good soil washed away by erosion was deplored by Mr. Ellender but credit was given to the Soil Conservation Service in slowing down this destructive process. In China, the Yellow River carries away more top soil than all of the rivers in the U. S. combined. This is one of the important factors of China's inability to feed itself, he declared.

Officers Elected

J. E. Totman, Baltimore, Md., was named chairman of the board, succeeding Ray L. King who remains a member of the board. Taking Mr. Totman's place as vice-chairman of the board, is Louis Ware.

Board Members Named

New members of the NFA Board of Directors were elected at the meeting. They are: J. E. Nunnally, Atlanta, Ga.; R. P. Martenet, Indianapolis, Ind.; and T. W. Allen, Attala, Alabama. Messrs. Nunnally and Allen replace Robert S. Cope, Savannah, Ga. and H. A. Parker, Sylacauga, Ala., respectively, whose terms expired. Mr. Martenet fills a vacancy caused by death.

Re-elected were L. Graham Campbell, Cranbury, N. J.; Elbert N. Carvel, Laurel, Del.; Ralph E. Fraser, Bangor, Me.; H. B. Fultz, Miami, Fla.; E. A. Geoghegan, New Orleans; Walter E. Meeken, Boston; C. D. Shallenberger, Shreveport, La.; and Louis Ware, Chicago.

Panel Discussion

WITH Dr. H. B. Siems, Swift & Co., Chicago, as chairman, a panel of experts discussed "A Century of Progress in Compounding and Utilizing Fertilizers." The discussion, presented by the Plant Food Research Committee of NFA, was handled by S. D. Gray, Northeast Manager of the American Potash Institute; Dr. K. D. Jacob, head of the Division of Fertilizer and Agricultural Lime, B.P.I.S.A.E., U.S.D.A., Beltsville, Md.; Vincent Sauchelli, director of Agricultural Research, Davison Chemical Corp., Baltimore, Md.; and H. H. Tucker, president, Coke Oven Ammonia Research Bureau, Columbus.

Leading off for the panel, Dr. Sauchelli spoke on the subject of

Panel of experts discussing a century of fertilizer progress at Tuesday morning session. Left to right: H. H. Tucker, speaking on nitrogen; S. D. Gray, discussing potash; Vincent Sauchelli, describing the role of phosphoric acid; K. D. Jacob, talking about mixed fertilizers; and H. B. Siems, moderator.



phosphoric acid, reviewing its history from the days when super-phosphate was made on the farm by a sort of traveling factory setup; up to the present day when the material is manufactured in dens which may hold from 20 to 100 tons of superphosphate. Dr. Sauchelli also discussed briefly, the role of minor elements in complete plant nutrition.

Mr. Tucker traced the development of nitrogen in fertilizer manufacture, reminding that the early sources were low nitrogen materials, such as tankage; then later, the introduction of the Shanks and Guggenheim processes, and later still, the coke oven industry which began in 1893. Only 12 ovens were in existence then, but by 1900, there were

1,085, he stated. In 1948, however, some 15,000 ovens were located in 86 locations throughout the U. S. The use of organic nitrogen has dropped from 90 percent of the total used in 1900, to less than 5 percent of the total used today.

Dr. Gray went into the history of potash use, pointing out how the first source of the material was from wood ashes. He then traced developments up to the present time, covering the early days when the only source was Germany, up to later discoveries of potash in the U. S., and how today's operations are independent of all foreign importations. He said that much of the increase in potash use is due to finding out how much of the material is removed with crops, such as clover. This must be replenished, he said, and an honest attempt is being made to do this.

In his portion of the panel, Dr. Jacob talked on mixed fertilizers, which includes combinations of the three elements discussed previously by his colleagues. He said that records since 1880, at which time some 350,000 tons of mixed fertilizers were consumed in the U. S., indicate a continual increase in use. Ten years ago, however, the curve took a decided upturn and the industry "went to town," as he put it. That tremendous developments have been made in technological progress and production processes, is too obvious to discuss at length, Dr. Jacob declared, but reminded that still more new things are ahead for the industry in the use of increasing numbers of grades, and the increasing use of liquid applications of anhydrous ammonia in various places.

Plant Food Panel

GRASSLAND farming was discussed by a panel representing the Plant Food Research Committee on Monday morning. Chairman of the group was James A. Naftel, agronomist, Southern Division, Pacific Coast Borax Co. Other members of the panel included Borden S. Chronister, chief agronomist, Southern Division, Barrett Division, Allied

Chemical & Dye Corp., New York; Malcolm H. McVickar, chief agronomist, NFA; and J. Fielding Reed, Southern Manager, American Potash Institute.

Dr. Naftel, in introducing the subject, stated that although the cultivation of grasslands is a desirable project, yet, much additional information and education is needed by great numbers of farmers before such a program can be successful. He pointed out that livestock experience is needed; that such information is not acquired overnight, and that this fact is a serious drawback. However, land fertilized and planted in grass is easily put back into food crop production, with better results, he said. "The plan has many opportunities but also some problems," he concluded.

Showing slides to illustrate his talk, Dr. McVickar declared that grass is a crop and should be treated as such, with careful preparation and fertilization. Pictures shown on the screen illustrated the necessity of using fertilizer in creating good grassland areas. The NFA agronomist stated that more education is needed. "Many farmers are beginning to appreciate the value of grass, but it still takes a lot of hammering to get the idea across," he concluded.

Dr. Reed emphasized the huge potential market which exists in the promotion of grassland fertilization. He said that more than 5 million tons of plant food would be necessary for pasture development alone, in addition to the amounts needed for the fertilization of other crops.

As an example of how fertilizer consumption is exceeding expected tonnages, he pointed out that potash consumption in the U. S. has already doubled the estimated figures for the early post-war years.

Mr. Chronister's theme centered around the education program to sell farmers on grassland programs. Of 34 states included in a recent survey, he said, 26 had pasture programs in operation, and only 8

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IN THE PHOTOS

Top row, (L to R): Ray King, chairman of board, and Russell Coleman, NFA president. Gov. Elbert N. Carvel of Delaware, Mrs. E. R. McCandless, G. E. Henderson, Jr. and W. W. Baker, Jr. In the last picture, Ralph Robey explains chart.

Second row, first photo: L. D. Hand, Weller Noble, former chairman of the board, B. B. Fall and C. D. Shallenberger. Center, J. E. Totman, Baltimore, newly-elected chairman of board of directors. Third picture, B. M. Machen, C. J. Ball, H. L. Shelly and J. H. Bryant.

Third row: Ray King making annual address; second shot: H. H. Tucker, M. V. Bailey, LeRoy Donald and Malcolm H. McVickar; third: American Cyanamid Co. group, taken in Greenbrier suite.

Fourth row: Sen. Allen J. Ellender; Fred S. Lodge, Assistant to NFA president, and Mrs. Russell Coleman; third photo, Dr. Ralph Robey during his talk.

Bottom row: Some of the one hundred ladies who took part in bridge tournament which was part of entertainment. First photo: Mrs. B. M. Machen, Mrs. F. S. Lodge and Mrs. B. A. Ford. Second shot: Mrs. F. B. Porter, Mrs. A. H. Sterne, Mrs. C. H. MacDowell and Mrs. M. A. Caine. Last photo: Mrs. F. Edward Smith, Mrs. J. R. Mell, Mrs. R. P. Newton, Mrs. Frank H. Totman (back to camera), Mrs. John Perriman and Mrs. W. H. Appleton.

Controlling diseases of vegetable crops with

ORGANIC FUNGICIDES

THE fact that plants are subject to various types of abnormalities was recognized at least 2,000 years ago, but the true nature of pathogenic plant diseases has been known for scarcely more than a century. The causal organisms of such diseases as the rusts and smuts of cereals which were among the first to be identified, were described only a short time previous to 1850. The use of fungicides for the control of plant diseases is confined to much the same period.

Copper sulfate was used to treat wheat seed as early as 1760 and sulfur was used on grapes and peaches for "mildew" control about 1825, but comparatively few fungicides were used to control plant diseases before 1850. Both lime sulfur, which was commonly prepared by boiling a mixture of lime, water and sulfur, and Bordeaux mixture, which is the reaction product of copper sulfate and lime in the presence of water, have been known to be excellent fungicides for well over 50 years. They are still widely used for the control of certain plant diseases. Lime-sulfur is primarily used to control fruit diseases, whereas Bordeaux mixture is most commonly applied to vegetables. Lime-sulfur is now being rather generally replaced by other forms of sulfur, including various organic compounds that contain sulfur. Similarly, Bordeaux mixture has steadily lost ground during the past 10 years to newer fungicides for the control of most of the foliage diseases of vegetables.

The fixed, or low solubility copper compounds, which can be in-

plied to plants without the addition of lime, were first introduced to the fungicide trade during the period between 1930 and 1940 as substitutes for Bordeaux mixture. They have since come into rather general use, especially on such Bordeaux-sensitive crops as tomato, cucumber and muskmelon. About 1940 another group of fungicidal materials, commonly spoken of as the "organics," began to appear in the list of experimental materials being submitted by the manufacturing chemists to those of the plant pathologists who are always searching for new and better fungicides for the control of various plant diseases.

One of the first of these organics was known as "Fermate," a trade name for ferric dimethyl-dithiocarbamate. This chemical has since been assigned the common name of ferbam. It is a derivative of dithiocarbamic acid, as are several others of the organic fungicides now being used on vegetables, such as "Zerlate," "Dithane," and "Parzate." "Fermate" was introduced primarily for use as a fruit fungicide, but was soon found to give better control of the anthracnose fruit rot of tomato than any of the other materials available up to the time of its introduction. However, it proved to be somewhat injurious to various crops such as celery and

cucumbers in early trials, and for that reason was easily displaced, as a vegetable fungicide, by a related compound that was introduced two or three years later under the proprietary name of "Zerlate." This material, which now has the common name of ziram is zincdimethyldithiocarbamate.

"Zerlate," and an identical compound known as "Methasan," were first tested to any considerable extent as fungicides in 1943. "Zerlate" has since become widely useful in the control of vegetable diseases. It is seldom used on fruits, however, because of the danger of zinc toxicity to the host plants. "Zerlate" (ziram) is now commonly recommended for the control of the anthracnose of tomato, cucumber, muskmelon and bean. Ziram also gives comparatively good control of the early blight (*Alternaria*) of tomato and potato, and the early (*Cercospora*) and late (*Septoria*) blights of celery. The *Phomopsis* blight and fruit rot of eggplant may also be controlled rather effectively with this compound, as can the *Cercospora* leaf spots of beet and pepper, and the *Macrosporium* and *Cercospora* leaf spots of carrots.

Zinc dimethyldithiocarbamate has one weakness, however, which has kept it from becoming universally recommended as a vegetable fungicide, and that has to do with its inability to control the late blight (*Phytophthora*) of potato and tomato. For this reason the search has gone on for a treatment that could be recommended for protection against this hard-to-control disease.

Before leaving ziram, the situation with respect to the control of

by

J. D. Wilson

Ohio Agricultural Experiment Station
Wooster, Ohio

tomato diseases should be discussed. This crop is subject to at least four leaf-spots and three fruit-rot diseases of considerable importance. One of the most widely distributed fruit rots is anthracnose. This disease is best controlled with ziram which, as mentioned above, gives fair control of early blight but comparatively poor control of late blight and *Septoria* leaf spot. On the other hand, none of the various fungicides which will control these two leaf diseases is the equal of ziram in the control of anthracnose. This situation has led to the rather general adoption of an alternating schedule for tomatoes in which ziram is used for the first control treatment, and this is then followed after a 7- to 10-day interval by any one of several materials which has the ability to control the leaf-spot diseases (a fixed copper, "Parzate," "Dithane" or Bordeaux mixture). The third treatment should again be ziram, the fourth a leaf-spot fungicide; and the fifth, if it is used at all, should be determined by the relative severity of anthracnose, or one or more of the leaf blights.

* A third derivative of dithiocarbamic acid made its appearance as a vegetable fungicide in the early 1940's under the trade name of "Dithane." In the liquid form it is disodium ethylenebisdithiocarbamate, and has been assigned the common name of nabam. "Dithane" is more effective as a fungicide after the addition of zinc sulfate to form the reaction product of zinc ethylenebisdithiocarbamate. This product has the proprietary name of "Dithane Z-78" and the common name of zineb. The disodium compound is also on the market under the proprietary names of "Parzate" liquid and "Thiodow," and the reaction product is available under the trade name of "Parzate" fungicide.

Results of preliminary tests conducted in 1943 indicated "Dithane" could be expected to give good control of such vegetable diseases as early blight of potato and tomato and the *Cercospora* blight of celery. Since that time a large number of experiments conducted in many different states has shown nabam and zineb to

be excellent fungicides to control many different vegetable diseases. They are now widely recommended for the control of the early and late blights of celery and carrot, and most of the leaf diseases of cucumbers and muskmelons. They may also be used on onion, beet, pepper and eggplant. As mentioned above, these materials are not as efficient as ziram in the control of anthracnose fruit rot of tomato. They may, however, be mixed in equal parts with that compound to control both the fruit and foliage diseases of tomato.

Potatoes treated with nabam and zineb frequently yield more than others sprayed with Bordeaux mixture or the fixed coppers, even though all of the plots may be similar from the standpoint of foliage condition. The reason for this is not always clear but it is possible that the zinc in these organic compounds sometimes acts as a nutrient to correct a zinc deficiency in the host plants. Interestingly enough, it also has been observed at least twice during the past four years in Ohio, that potatoes and tomatoes sprayed during the summer with zinc-containing fungicides were less severely injured by light frosts than were others in adjacent rows that had received copper in one form or another.

"Z.a.c.," which is somewhat similar to ziram in many of its fungicidal and chemical properties, has given rather promising results in the control of certain vegetable diseases. It has the chemical name of zinc dimethyldithiocarbamatecyclohexylamine. However, further testing will be required.

Another promising fungicidal material, which is still in the experimental stage, is manganese ethylenebisdithiocarbamate. At present it appears that this may prove to be the fungicide the vegetable pathologist has been hoping for to control both the foliage and fruit diseases of tomato.

Copper 8-quinolinolate ("Bioquin 1") is another chemical compound of high fungicidal efficiency that has been widely tested during the past few years. It is one of the two or three materials so far tested that will give satisfactory control of tomato anthracnose. However, its high

cost of manufacture is a factor against its general use on vegetables.

An organic mercury compound, which was introduced several years ago under the trade name of "Puritized," was found to give fair control of various foliage diseases of vegetables, and anthracnose fruit rot of tomato. However, it is somewhat phytotoxic, and this, together with the fact that it contains mercury, makes it unlikely that it will come into general use.

"Phygon" (dichloro naphthoquinone) has been found to give fairly good control of a number of vegetable diseases but it is also somewhat phytotoxic, and this has apparently acted as a check against its more general use on vegetables. A related compound known as "Spergon" (tetrachloro parabenzoquinone) is widely recommended and used as a seed treatment to control damping-off, and is especially useful on legume seeds.

Another seed treatment material, bearing the trade name of "Arasan," is also a very effective seed treatment material. The active ingredient is tetramethylthiuram disulfide, which recently has been assigned the common name of thiram.

This practically completes the list of those organic compounds which have offered most promise as fungicides for the control of vegetable diseases. Some, such as "Zerlate," "Dithane" and "Parzate," are now commonly recommended and used for the control of various foliage and fruit diseases, of vegetables; and others, like "Arasan" and "Spergon," are used as seed treatments. Several others, among which are "Fermate," "Bioquin 1," "Phygon" and "Puritized," have failed to come into general use on vegetables, not because of any lack of fungicidal efficiency, but for other reasons such as phytotoxicity or excessive cost. Still others, such as "Z.a.c." and manganese ethylenebisdithiocarbamate may come into general use later. Many, many more compounds have been tested experimentally only to be discarded within a short time for various reasons, even though they may have been highly toxic to fungi in screening trials★★

*Pasture fertilization, expanding markets
for fertilizer products, importance of
maintaining strong independent industry
emphasized at fifth annual convention of*

American Plant Food Council

Hot Springs, Virginia

SINCE the American fertilizer industry has broken all plant food production records for the past eleven years, it is a good indication that "no country in the world has a fertilizer industry so well geared to the needs of farmers as the industry in the United States," was pointed out by Clifton A. Woodrum, president of the American Plant Food Council at that group's fifth annual meeting at the Homestead Hotel, Hot Springs, Va., June 29 to July 2. Mr. Woodrum's address, heard at the opening session, called attention to the achievements of the industry during the past eleven years. He stated that the industry had furnished agriculture with 18½ million tons of fertilizer last season, compared to only 7,758,000 tons in 1938; an increase of 139 percent.

He described the industry as "a vast network of over 1,100 fertilizer mixing plants conveniently located to meet the needs of farmers," adding that "in addition, millions of dollars are invested in mining operations, refineries and chemical manufacturing plants to supply the necessary raw materials such as nitrogen, phosphate, and potash used in making the recommended fertilizers."

Mr. Woodrum said the great expansion in the fertilizer industry is attributable to several reasons:

(1) The farmers of America have become more and more aware of the fact that by the proper use of fertilizer they can obtain not only increased production at lower unit costs but more nutritious crops.

(2) Farmers have realized that proper conservation and protection of soil fertility requires, among other procedures, the application of plant foods.

(3) Higher farm income has brought greater consumption of commercial fertilizers.

(4) During the past few years, great areas of the country, particularly in the midwest, have suddenly awakened to the great advantages to be derived from the use of commercial fertilizers.

Mr. Woodrum said the fertilizer industry's "development during the war and postwar years can best be described by Dr. Richard Bradfield, Head, Department of Agronomy, Cornell University, Ithaca, New York, who said:

"We have a highly developed chemical industry to supply us with high-grade fertilizers at reasonable prices and in practically unlimited quantities. No country has ever had a fertilizer industry comparable to it."

Focusing attention upon a tremendous potential market for ferti-

zer materials in the green pasture program, W. R. Thompson, Associate Leader of Extension Agronomy, State College, Mississippi told the group that U. S. farmers need a "minimum of 108,500,000 tons of mixed fertilizers just on pastures," emphasizing that plant food properly used on pastures will return farmers from "\$5 to \$9 profit for every dollar invested."

The Southern agronomist said that "plant food properly balanced is the starter, maintenance and profit gauge of the pasture program."

He pointed out that "pastures with the wise use of plant food will do four major things for the soil":

(1) Save the soil from erosion; (2) Make the soil rich; (3) Grow grass and clover to keep the soil covered and, (4) Make money to keep people on the soil.

Mr. Thompson added, however, that man will have to do his part for successful use of plant food on pastures. Among the necessary acts, he said, is the use of enough plant food to get results, and proper management of the grasses and clovers after they get on the pastures. A long-time plan must be made for the use of plant food on pasture crops, he insisted, comparing such a plan to the plan or blueprint for constructing a skyscraper or a bridge. "No one has failed with a good plan for using the



correct amount of plant food and many have failed where no plan was made . . . even though both may have used the same amount of fertilizer.

"A plan to use the correct amount of plant food over the pasture land in the United States would double our production and double our income with \$5 to \$9 profit from every dollar invested in plant food properly used."

Mr. Thompson said that the South can't get by without plant food on pastures . . . and that plant food is the secret of a profitable pasture program.

Senator Spessard L. Holland, Florida, a member of the Senate Agriculture Committee, told the A.P.F.C. assembly that "agriculture in general is keeping its feet on the ground and is thinking in terms of preserving individuality, independence and private enterprise in agriculture, and that it has no desire for governmental regimentation of for dependence upon a Federal dole." In his address on Friday morning, the Senator declared that "a Federal price support program for agriculture, aimed at the maintenance of agricultural prosperity and buying power and at continued production of abundant supplies of food and fiber at fair prices has become a fixed part of our governmental philosophy." He pointed out, however, that

EXECUTIVE COMMITTEE: Right after their election, members of the American Plant Food Council's Executive Committee "posed" for the above picture. They are, left to right: J. A. Howell, Richmond, Va., President, Virginia-Carolina Chemical Corp.; John W. Collis, Louisville, Ky., President, Federal Chemical Co.; A. F. Reed, El Dorado, Ark., Vice President, Lion Oil Co.; W. T. Wright, Norfolk, Va., Vice President, F. S. Royster Guano Co., Chairman, and Paul Speer, New York City, Vice President, U. S. Patash Co.

"we are passing through a period in which the price support structure is in process of evolution from a war-time program to a long range peace program."

Senator Holland said "the most difficult problem which confronts the Congressional Committees on Agriculture is, therefore, what kind of permanent support price program will best serve the vital needs of the nation, both the consuming public and the producers."

He listed a number of questions to be answered before a stable support price program can be created. These included problems such as: how high will be the level of support prices; specific crops to be covered; should the program be largely confined to the so-called basic crops; will the level of support be fixed or flexible; how shall we protect the government from excessive costs; and will

price support be tied in with soil conservation, and, if so, how.

Senator Holland congratulated the fertilizer industry in meeting the plant food requirements of American farmers and said that the contribution of the Florida phosphate industry toward winning World War II was "a record which constitutes one of the unsung epics of vital service in the war effort."

That farmers should "always plan to restore soil fertility and continuously build toward better yields year after year," was the theme of an address on Saturday morning by Albert S. Goss, master of the National Grange. Mr. Goss emphasized that it is only through such sound land management practices that the U. S. has been able to raise better and bigger crops while much of the rest of the world is slipping. He added, however, that many American farmers also slip, but this only emphasizes the great work being done by those who are taking proper care of their soils.

Addressing particularly the six teen-age National winners selected from some 20,000 entries in the country-wide essay contest sponsored jointly by the Grange and the A.P.F.C., the Grange Master declared that the benefits derived from such contests are "beyond calculation."



CAMERA HIGHLIGHTS of the CONVENTION

Upper Left: Senator Spessard L. Holland (D-Fla.), a member of the Senate Agriculture Committee, told A.P.F.C. members that "agriculture in general is keeping its feet on the ground. . . . it has no desire for governmental regimentation or far dependence upon a Federal dole."

2nd Left: George F. Dunbar, East Croftsbury, Va., first place winner in the essay contest sponsored jointly by the National Grange and the Council on the subject of "Soil Fertility and the Nation's Future," is shown with Judge Woodrum, Asst. Secretary of Agriculture Knox T. Hutchinson, Chairman of the National Board of Judges, and Albert S. Goss, Master of the Grange.

Below: Mr. Hutchinson presents a certificate of award and a check for \$1,000 to first place winner Dunbar.

Lower Left: Shown at the head table of the banquet session are (left to right): Rep. Chas. B. Hawen (Iowa); Mrs. J. A. Howell, wife of the immediate past chairman of the Council's Executive Committee and Rep. Thos. G. Abernethy (D-Miss.).

Upper Center: After the ball was over at the fifth annual convention, the camera caught Mr. and Mrs. J. A. Howell of Richmond, Va. Mr. Howell is President of Virginia-Carolina Chemical Corporation.

Upper Right: Speaking extemporaneously, Rep. Thos. G. Abernethy (D-Miss.), a prominent member of the House Agriculture Committee, congratulated the members of the American Plant Food Council on their support of sound agricultural education and research programs.

2nd Right: Two well-known folks at the convention found at least one subject in common—they both are from Mississippi. J. E. Culpepper, Kansas City, Asst. General Sales Manager, Spencer Chemical Co. is shown with Dennis Barber, who won second place in the essay contest.

Lower Right: Taking time out for a little "shop talk" are: Walter S. Rupp, Baltimore, Md. (left), President, Baugh and Sons Co. and a member of the Council's Board of Directors and Francis White, Vice Chairman of Board, Baugh & Sons.

Bottom Right: Golf Committee Chairman Albert B. Baker, Jr., Bradley and Baker, New York and committee member C. F. Burroughs, Jr., Treasurer, F. S. Royster Guano Co.

Photos by Louis Wilson



(The theme of the essay contest: "Soil Fertility and the Nation's Future.") He explained that "any sound farming program must be built around the basic truths that when soil is allowed to blow away or to wash away, it is gone for good; and that when minerals are removed from soil by cropping, they must be replaced if good yields are expected.

Emphasizing the importance of a farmer's knowing and studying his land, Mr. Goss said that he should study the type of soil, know its mineral contents, recognize its tendency to wash or to blow, and to determine its "durability." In short, "he should gear his farm practices to the main purposes of conserving and building up his soil resources," Mr. Goss concluded.

Essay Winner Awards

IN his address in connection with the awarding of prizes to the essay contest winners, Assistant Secretary of Agriculture Knox T. Hutchinson reminded the group that the American people would be "completely foolhardy" if they failed to recognize that the present domestic and world tensions demand that basic resources, and especially the land, must be conserved. To accomplish this, he said, teamwork of not only the Government and farmers must be achieved, but also the intelligent support of the whole citizenry. "It needs the interest of bankers and of business people who deal with farmers," he declared. "It needs the support of educators and the press, radio, and television, because these are agencies which mold public opinion," he continued. He pointed out that the earlier these facts are learned, the better, "We cannot start too young in this work of learning about the conservation job, and that is why this annual (essay) contest is valuable," he said. "I sincerely hope that all of the thousands of young people who have submitted entries will continue . . . to display interest in our conservation needs."

Serving with Assistant Secretary of Agriculture Hutchinson on the Board of Judges were: Dr. Hugh H. Bennett, Chief, Soil Conservation

Service, U. S. Department of Agriculture; Miss Lois M. Clark, Assistant Director, Division of Rural Service, National Education Association; Dr. W. T. Spanton, Chief, Agricultural Education Service, U. S. Office of Education and Dr. M. L. Wilson, Director of Extension Work, USDA. The six National winners were introduced by Clifton A. Woodrum, president of the Council.

At the annual Plant Food Banquet on Saturday evening, Dr.

W. T. Wright, vice-president, F. S. Royster Guano Co., Norfolk, Va., was elected chairman of the five-man executive committee of the American Plant Food Council at the Hot Springs meeting. The board also elected nine new members to its roster of directors.

In addition to Mr. Wright, other members of the executive committee are: John V. Collis, President, Federal Chemical Company, Louisville, Ky.; Joseph A. Howell, President, Virginia-Carolina Chemical Corp., Richmond, Va.; A. F. Reed, Vice President, Lion Oil Company, El Dorado, Ark.; Paul Speer, Vice President, United States Potash Company, New York City.

Elected to the Board of Directors for three-year terms are: W. B. Badenoch, Richmond Guano Co., Richmond; Mr. Collis; George Cushman, Gen. Mgr., Long Island Produce & Fertilizer Co., Riverhead, N. Y.; Howard Fisher, Gen. Mgr., The Michigan Fertilizer Co., Lansing, Mich.; George W. Gage, Pres. & Gen. Mgr., Anderson Fertilizer Co., Inc., Anderson, S. C.; C. B. Robertson, President, Robertson Chemical Corp., Norfolk, Va.; M. S. Wright, President, Texas Farm Products Co., Nacogdoches, Tex. and F. J. Woods, President and Treasurer, The Gulf Fertilizer Co., Tampa, Fla.; J. D. Robbins, Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C., was elected to the board to fill an unexpired term ending June 30, 1951.

Douglas S. Freeman, author and Pulitzer prize winner, told the guests that "there can be no agricultural stability without soil fertility," and asserted that "property right does not extend to the exhaustion of the fertility of land."

The importance of maintaining replenishing and increasing soil fertility was emphasized by the banquet

speaker who declared that "the American society must recognize that every man is under obligation to leave the land in as good condition as he found it, and if he can, he must improve this valuable heritage in order to protect the future of generations to come."

He lauded the part played by the fertilizer industry in sponsoring and encouraging sound land management principles. "Although fertilizers are not the sole ingredient in a sound farming program, they are receiving increased emphasis by farmers who realize that lowering the per unit cost of production is essential in building a self-sustaining agriculture. . . . The value of fertilizers in maintaining the fertility of soils is emphasized by the fact that plant food consumption has been nearly tripled since the pre-war years . . . a tribute to the sound business operations of farmers as well as to the industry which greatly expanded its operations during the difficult war and postwar years," he said.

On the lighter side, the conventioners enjoyed perfect weather for golf, tennis and other sports. The tennis courts were busy nearly every minute of the afternoon recreation periods, and an unusual number of participants took part in the golf tournament.

A cocktail party to which all those attending the convention were invited, was sponsored by the Potash Company of America preceding the annual banquet on Saturday evening. Entertainment following the banquet itself featured a group of songs by Miss Gwen Omeron, stage and radio star. Judge Woodrum acted as master of ceremonies at all the sessions, including the informal singing programs held in the evenings.

As evidence of the enthusiasm with which Dr. Thompson's pasture fertilization talk was received, Representatives Thomas G. Abernethy, Mississippi and Charles B. Hoeven, Iowa, members of the House Agriculture Committee, extended to Dr. Thompson an invitation to address the Agriculture Committee at some later date on the subject of grasslands in a sound agricultural program.

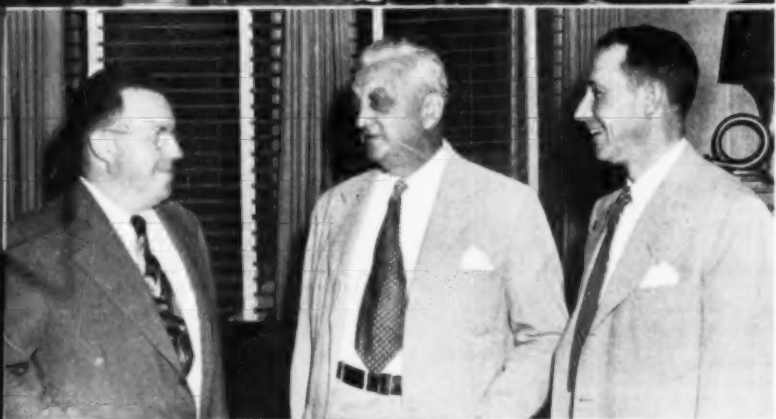


The Convention

Upper Left: Nationally-known leaders who appeared on the Plant Food Council convention program, included Dr. Douglas Southall Freeman (second from left), Richmond, Va., well-known historian and author, and Senator Spessard L. Holland of Florida (extreme right), shown with Mrs. Holland and Council President Clifton A. Woodrum.



Left to right are: Rep. Thos. G. Abernethy (D-Miss.), Chairman of the House Agriculture Subcommittee on fertilizer and farm machinery; J. A. Howell, Richmond, Va., President, Virginia-Carolina Chemical Corp. and past Chairman of the Council's Executive Committee; John J. Heimburger, Research Specialist, House Agriculture Committee; George E. Politt, New York City, Vice President, Potash Company of America and Ralph B. Douglass, Norfolk, Va., President, Smith-Douglass Co., first Chairman of the Council's Executive Committee.



What county agents are thinking and doing at the "grass roots" probably is the subject of this conversation between Rex Carter, Uniontown, Penna. (left), President, National Association of County Agricultural Agents; W. T. Wright, Norfolk, Va., Vice President, F. S. Royster Guano Co., newly-elected Chairman of the Council's Executive Committee (center) and Dr. John R. Taylor, Jr., Agronomist of the American Plant Food Council.



VEEPS. Three well-known members of the fertilizer industry elected Vice Presidents of their respective companies during the past ninety days, are, left to right: J. H. Culpepper, Smith-Douglass Co., Norfolk, Va.; G. Tracy Cunningham and W. E. Shelburne, Armour Fertilizer Works, Atlanta, Ga.

in Pictures

Upper right: A capacity crowd heard Dr. Douglas Southall Freeman at the banquet session of the American Plant Food Council's 1950 Convention at The Homestead. He told his listeners that "property right does not extend to the exhaustion of the fertility of the land," adding that "there can be no agricultural stability without soil fertility."



More than 20,000 young men and women participated in the nation-wide essay contest sponsored jointly by the American Plant Food Council and the National Grange. In addition to prize money, the winners received a free trip to The Homestead, in connection with the Council's 1950 Convention. Left to right, they are: Albert B. Harvey, Hockessin, Del., sixth place; Dennis Barber, Route #1, Hub, Miss., second place; Wm. N. (Bill) McCaw, Lowden, Wash., fourth place; George F. Dunbar, East Craftsbury, Vt., first place; Kenneth L. Allen, Latta, S. C., third place and Miss Lucille Hahn, Route #1, Havana, Ill., fifth place.



Between session chats are the order of the day at any convention and the fifth annual meeting of the American Plant Food Council was no exception. Participants are, left to right: Robert M. Nash, Federal Chemical Co., Louisville, Ky.; E. N. Shelton, Tennessee Corp., Atlanta, Ga., and J. D. Stewart, Jr., Executive Vice President, Federal Chemical Co., Louisville.



A traditional feature of the American Plant Food Council convention is a tea. Some of the members of the Ladies' Committee, left to right, are: Mrs. Ralph B. Douglass of Norfolk, Va.; Mrs. Horace M. Albright of New York City; Mrs. Albert B. Baker of New York City; Mrs. L. Dudley George of Richmond, Va.; Mrs. C. A. Woodrum of Roanoke, Va.; Mrs. J. A. Howell of Richmond, Va.; Miss Martha Anne Woodrum of Roanoke, Va.; Mrs. Harry B. Caldwell of Greensboro, N. C., and Mrs. J. D. Stewart, Jr., of Louisville, Ky.



The Listening Post

Late Blight and Blue Mold Control With Fungicides

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of **AGRICULTURAL CHEMICALS**. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



Late Blight

CONTROL materials and measures used to combat plant diseases, in particular the downy mildews covered by the Warning Service, have again proved their worth. Although the downy mildew type diseases have not been on a rampage so far this season, sufficient activity has occurred to test the qualities of both the fungicides used and the effectiveness and timeliness of application. High up on the list, and used almost exclusively for the control of late blight in Florida this season were nabam and zinc sulfate. Disease control was excellent where applications were thorough, and in one case an epidemic of major proportions was averted. In the case of blue mold control, excellent protection was reported where good spraying and dusting programs were carried out. Fungicides used were "Ferbam," "Dithane Z-78," and "Parzate." Control was reported as "good" when recommended procedures were followed. In one case sprays were reported as giving better control than dusts.

Coupled with these man-made control measures and their application, other factors were operating either to check the growth of plants or the diseases themselves. The warm January weather, with above-normal temperatures, occurred over a large part of the country. This was followed by a cold, dry spring, some late frosts, and limited soil moisture. Where adequate moisture conditions occurred, the diseases would be active and then die down again when dry, warm conditions prevailed.

THUS far in 1950 the outstanding aspects of the late blight situation, aside from interest in control, were fourfold. One was the presence of the stem canker phase of the disease in many instances; secondly, an aspect of the problem this year to date centered around rejection of to-

Since the above report was prepared, Dr. Miller states that late blight on tomatoes has taken on a more serious aspect. During early June it became widespread and destructive in Copiah, Lincoln and Hinds Counties, Mississippi. In some fields grown for Green Wraps, it caused a total loss. It was also reported as causing stem cankers on plants shipped in from South Georgia, in fields in New Jersey, Maryland and Pennsylvania. With favorable weather conditions, these diseased areas, may serve as important sources of infection and permit the tomato strain of late blight to become epidemic.—The Editor.

matos at a northern market due to late blight on the fruits shipped from a southern area. Thirdly, there was the movement from the southern plant-growing area around Bartow, Florida, of blight-infected tomatoes to Mississippi and Virginia. And, the fourth point of the problem was the overwintering of late blight under greenhouse conditions.

In the order of disease appearance, blight was present in the Homestead area of Florida on potato and tomato during the latter part of 1949. In this area 100% of the growers used nabam and zinc sulfate on a five to seven day schedule and, where applications were thorough, excellent disease control was obtained and an

epidemic of major proportion averted. Towards the end of January and the beginning of February, tomato late blight was reported in the Leesburg area and by the middle of February was reported on potatoes from Hastings.

In the Fort Pierce area tomato late blight caused considerable damage in some fields. Growers used nabam and zinc sulfate but cultural practices made spraying difficult. Soil moisture was high here, with heavy dews and fogs of common occurrence; also, plants were grown on beds two to three feet high. An added source of inoculum existed in the abandoned fields of fall tomatoes which were still alive and heavily infected.

Following a request by a member of Congress for an investigation of the potato and tomato late blight situation in this south Florida area and the reasons for rejection of tomatoes at the terminal market, a special survey was made of the Homestead-Fort Pierce area the last weeks of April. The disease was found to be unimportant on potatoes but did cause damage to a few fields of tomatoes where control measures were poorly applied. As stated above, the use of nabam plus zinc sulfate was largely responsible for the comparatively little damage from late blight this year. Two commercial loads shipped from this Fort Pierce area, when inspected on March 28th at the Baltimore terminal market, were found to be seriously affected with late blight. An outbreak of blight occurred in the Fort Pierce area around March 17-20 which would have been showing up on the fruits reaching the market about the 25th to the 28th. However, after this mid March favorable period for blight development, no further outbreaks occurred. This was due to warm, dry weather and the application of control measures.

In the Bradenton area the disease was present through the winter but was active only during periods of unusual moisture. It caused no losses on well-grown tomatoes except in a few small fields where again late blight did not cause a loss of fruit to any grower who did a good job of spraying.

In Georgia late blight was found on tomatoes in three cold frames at Tifton. The plants were immediately destroyed at the request of the State inspectors. No late blight was observed in or reported from any green-wrap fields until the end of May when it was observed near Adel, Georgia, on plants shipped in from Florida. Late frosts in March and April delayed the green-wrap fields.

In the Weslaco region of Texas this year late blight occurred on the fall crop of potatoes in January and by middle February it appeared also on young plants of tomatoes with stem lesions prominent.

Potato late blight was found in a field of Bliss potatoes on Edisto Island, South Carolina, on May 11th. The disease was scattered over a large field and was present only as scattered lesions except for a very small, low spot. Sebago and Cobblers potatoes at Edisto and at Meggett were free of blight. By the end of May blight had spread but little.

Greenhouse Blight

IN the two cases of late blight reported in the greenhouse, one was in Virginia where late blight showed up in early May on tomato seedlings in grower's greenhouse. Likewise, the disease was in the stem canker stage. The other case of late blight occurring in the greenhouse was in New Castle, Pennsylvania, where blight on tomatoes was present in two greenhouses. It was found on old tomato plants and spread to seedlings in the same greenhouse. This type of occurrence furnishes another source of overwintering inoculum which would be spread to the field in early spring.

It is too early to predict what the ultimate blight situation will be this year. However, there appear to be numerous sources of inoculum and if weather conditions are favorable for disease development, "fungicides at the right place and time" should be the keynote of confident control.

Blue Mold

THE tobacco blue mold situation so far this season has been a problem of many factors, principally those concerned with weather conditions. Following a warm winter and

Distribution of Blue Mold and Late Blight, January to June 1950



Tobacco Blue Mold Distribution, January to June, 1950.

Late Blight, Tomatoes & Potatoes (circles= tomato blight with "T", tomato blight in greenhouses. Black dots= potato blight).

the above-normal January temperatures, (see Table 1) the stage was set for a great deal of blue mold activity. In some cases it was severe and appeared early, but the cold, dry weather of spring checked its development. Also, in some cases, the same spring weather delayed growth of plants, resulting in poor stands. Where stands were poor, growers lost interest in spraying. Despite an acute plant shortage in some cases, apparently there were enough late plants to fill the demand at transplanting time in the far South. Resetting, of course, had to be done in some cases. This cold spring, plus insect damage and dry soil conditions, were contributing factors to a critical plant shortage in some cases. Blue mold took its toll in some untreated beds but it did not seem to be the chief cause of generally poor stands. Although reports stated that blue mold was severe in untreated beds, adequate to excellent protection was afforded by good spray and dust programs. Where control

programs were conducted, "Ferbam," "Dithane Z-78" and "Parzate" were used as dusts or sprays.

In the most southern of the tobacco-growing states, blue mold was found on February 11th in an old bed of cigar-wrapper plants near Quincy, Florida. At this time also it was reported as generally distributed in Alachua County. At the time transplanting was completed, in some cases where timeliness and thoroughness of dusting were not achieved, blue mold was severe in many cigar-wrapper tobacco beds. Mortality was as high as 80% on untreated beds. Overall loss was perhaps 30%. Control was good wherever recommended procedures were followed.

The Georgia plant situation was acute, primarily as a result of the failure to obtain stands during the unusually dry winter. Less than 10% of observed beds showed normal plants and at least 20% were near failures as of March 15th. There were not enough early plants to set half the

TABLE I

Temperature and Precipitation data for January, 1950, at five southern weather stations in tobacco-growing areas.

Location	Aver.	Temperature			Precipitation	
		Departure from normal	Max.	Min.	Total Precip.	Departure from normal
Quincy, Fla.	64.5° F.	+11.0°	81°	34°	66	-3.82 in.
Tifton, Ga.	63.0°	+11.5°	82°	27°	1.20	-3.19
Florence, S. C.	56.2°	+10.2°	80°	29°	2.46	-56
Henderson, N. C.	51.8°	+10.9°	78°	22°	2.26	-97
Chatham, Va.	40.9°	-0.7°	66°	17°	1.88	-1.30

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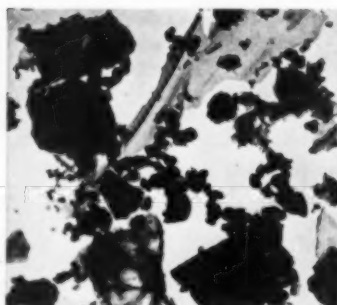
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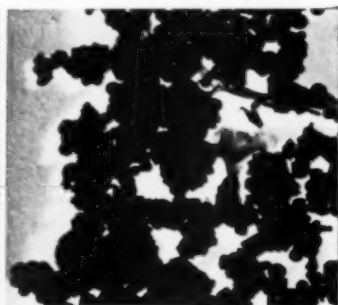
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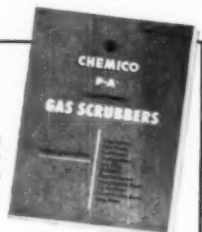
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acreage on time. The supply of late plants was very limited but seemed sufficient to satisfy general demands.

In South Carolina the blue mold season was at least one month ahead of normal, owing to the above-normal temperatures in January and February. Plant stands in early February were good and soil moisture favorable.

In North Carolina blue mold was distributed by the middle of

March throughout the southeastern counties and found as far west as Hoke County and as far north as Wake County. Spring weather conditions were too cold for its development. However, mold appeared earlier than usual, as much as one to three weeks earlier than last year. Plant stands were poor owing to unfavorable weather at time of emergence and cold weather following

(Turn to Page 77)

The situation in Nebraska is critical only in the northeastern counties where borer activity was most evident last year.

Observations through June 10 indicate that the corn borer situation in South Dakota will be serious. A large population of borers developed last fall, winter survival was high, and development of the insect is now progressing rapidly after getting off to a delayed start. In the southeastern part of the state about 50 percent or more of the larvae have pupated.

Records from 8 counties in the southern half of Wisconsin indicated that from 73-98 percent of the larvae survived the winter and that pupation was well under way by early June in these and other counties. Larvae were also pupating in Ohio, and a report from New Jersey on June 9 indicated that pupation was complete and that 58 percent of the moths had emerged at Moorestown.

Summer Insect Invasion Under Way



This column, reviewing current insect control programs, is a regular feature of **AGRICULTURAL CHEMICALS**. Dr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., E. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

European Corn Borer

REPORTS on the development and status of the European corn borer in the various States are being assembled in cooperation with State entomological agencies and distributed again this year by the Bureau of Entomology and Plant Quarantine's European corn borer research laboratory, which was recently moved from Toledo, Ohio to Ankeny, Iowa. The third weekly report in that series, prepared June 14, indicates that in Illinois moisture is playing an important part in borer development. Although continued drought has killed off a few larvae and pupae, it has also delayed pupation and thus favored the insect. Moth emergence was well advanced by June 10 in the southern counties, and eggs were being laid in the St. Louis areas. In south-central Illinois, the prospect of infestation continues slight, but in the north-central part of the state damaging infestations in early corn appear highly probable. A report issued by entomologists of the Illinois State Natural History Survey for the week ended June 17 indicated that egg laying had started during the week in most parts of the state. They pointed out that well over a million acres of corn in Illinois would prob-

ably need treatment some time between June 26 and July 10.

The first corn borer moths had emerged by June 5 in southern Indiana and were expected shortly thereafter in the north-central part of the state. No pupation had been observed in northern Indiana by June 1. The fact that borer development was delayed there with corn coming along nicely suggested a possible heavy first brood infestation in prospect for that area.

In Iowa, a high percentage of the borers had pupated by June 13 and moths had started to emerge in many areas.

Surveys of last year's cornfields in northeastern Kansas around the first of June showed that few living borers were present but that moth emergence had apparently begun. In Missouri, corn borer egg masses were found June 7 and 8 in Lewis and Sullivan counties.

The late cool spring experienced in Minnesota has delayed borer development. In the southern parts of the state pupation was approaching 50 percent by June 13 and emergence of moths was well under way. Reports indicated that the situation there is shaping up for serious first brood infestation.

Grasshoppers

COLD wet weather occurred during most of May throughout much of the Great Plains and Western States. As a result, grasshopper hatching was delayed generally. By early June populations of economic importance were developing in scattered localities in the range areas of Wyoming. Weather conditions, however, remained unfavorable for grasshopper hatching and development in Montana and populations continued light at least through June 10.

Range hoppers began hatching rapidly during the early part of May in northwestern Nevada and southwestern Oregon. Control operations were in full swing in the infested areas of northwestern Nevada around the middle of the month and were tapering off by early June. Good kills were obtained in practically all areas that were sprayed or baited. Hatching and development of range species progressed a little more slowly in southeastern Oregon.

Grasshopper control was carried on during May by farmers and ranchers throughout California and the results were satisfactory in most instances. In Merced, Tehama, and

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other California counties where cooperative "all out" grasshopper control programs were conducted last year, only minor infestations developed this season. In San Diego County wet sodium fluosilicate bait has given excellent kill of the clear-winged grasshopper on egg beds. Outstanding results with a substantial saving in cost were obtained by substituting dried orange pulp meal in place of bran in the bait formula.

Cotton Insects

STATE and Federal agencies in a dozen states are cooperating again this year in conducting surveys of cotton insects. Information obtained from these sources is being compiled in the Bureau of Entomology and Plant Quarantine's Division of Cotton Insect Investigations and distributed in the form of periodical reports. Entomologists in North Carolina, Mississippi, Louisiana, Arizona, Oklahoma, Texas and probably other states are also issuing reports at intervals giving more detailed information on the cotton insect situation in their respective states.

The boll weevil went into hibernation in very large numbers late in 1949 in all the areas where this pest occurs. This situation, coupled with mild winter temperatures, resulted in the survival of extremely high weevil populations this spring in Virginia, North Carolina, South Carolina, Louisiana, and parts of Texas. These insects probably survived the winter in large numbers in all areas where they were abundant last fall. Weather conditions have continued favorable for the weevils and they were reported as occurring during May and early June of this year in larger numbers than ever previously recorded during comparable periods in Alabama, Mississippi, South Carolina, and Tennessee.

Thousands of cotton farmers, aided and urged by the entomologists and the Extension Services, are making preparations to carry on an intensive fight against the weevil. Benzene hexachloride, calcium arsenate, and toxaphene are the insecticides now commonly recommended for weevil control and which will be widely

used this season. Other materials that have shown promise in tests against the weevil or that have been used effectively in some areas or under certain conditions are aldrin, chlordane, dieldrin, heptachlor, and lindane.

The first cotton leafworm this year in the United States were collected on May 10 in Zapata County, Texas. They were found in Cameron County on May 11 and through June 15 were also taken in Calhoun, Duval, Kleberg, Maverick, Nueces, Refugio, and San Patricio Counties. By that time they were becoming widespread and were building up to some extent in the Lower Rio Grande Valley of Texas and across the river in the adjacent cotton area of Mexico. Insecticides are being applied for leafworm control, especially in areas where flood rains occurred. The early arrival of the leafworm in this country means that cotton farmers must be on the watch for the pest and be prepared to take prompt action if it becomes abundant in their fields. Calcium arsenate, paris green, or lead arsenate have long been the standard materials for successful control of the cotton leafworm. Dust and spray formulations of benzene hexachloride, toxaphene, a mixture of benzene hexachloride and DDT, or a mixture of toxaphene and DDT, are also effective in controlling this pest.

Fruit Insects

CODLING moths began to emerge in many apple-growing areas around the middle of May. Activity by this insect was retarded over much of the eastern part of the country toward the end of that month, due to cool, rainy weather. Moths were emerging in considerable numbers in New Jersey around the first of June, emergence was about 50 percent complete in Ohio, eggs were hatching at that time in southern Indiana, and western Kentucky, and by the middle of June emergence from overwintered larvae was practically completed in most areas.

In general, infestations of the red-banded leaf roller appear to be somewhat lighter than last year. The oriental fruit moth also seems to be somewhat less abundant than last year

in many areas from which reports have been received.

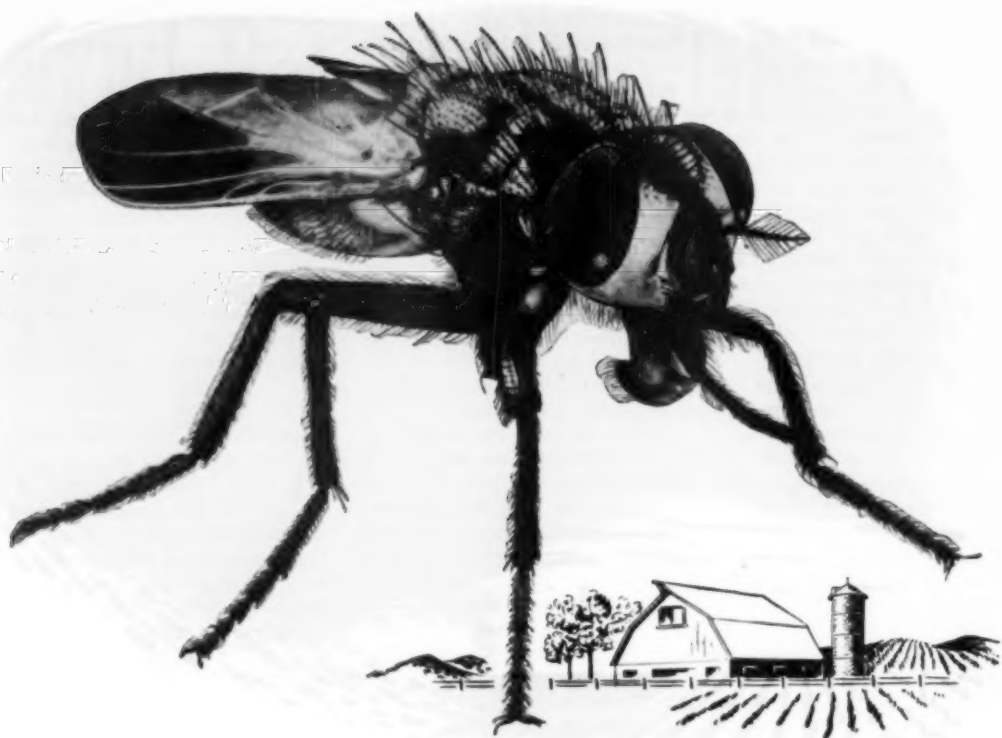
Toward the middle of June plum curculio infestations in peaches were heavy in the Cumberland-Shenandoah fruit district of West Virginia. The curculio was reported to be causing severe injury to apples and peaches in northeastern Kansas and Michigan, and considerable injury to these fruits appeared likely in Massachusetts. This insect has apparently caused little damage to peaches in the Fort Valley area of Georgia.

Truck Crop & Vegetable Pests

ACTIVITY by the Mexican bean beetle continued to increase through May. During the first half of June moderate to heavy infestations were reported in Atlantic Coast districts extending from New York to Mississippi. Infestations were lighter in Tennessee, Ohio, Colorado, Nebraska, and Wyoming. Light to moderate infestations of the bean leaf beetle were reported during May and early June from many states, including Maryland, Virginia, Tennessee, South Carolina, Georgia, Florida, Alabama, and Mississippi. The seed-corn maggot was destructive to beans during the same period in parts of New York, New Jersey, Maryland, Virginia, Idaho, Washington, and southern California.

Light to moderate infestations of the pea aphid were reported attacking peas in many areas during May. This insect appeared to be increasing somewhat in New York early in June, and toward the middle of that month was on the increase in the Blue Mountain district of Washington-Oregon. The pea weevil was seriously abundant in New York during June and insecticide applications were required toward the middle of the month.

Potato aphids occurred in destructive numbers on tomato in New York and Ohio during the first half of June. The green peach aphid was building up on bell peppers in southern California toward the middle of June to the point where insecticide applications were required. Aphids were unusually numerous at that time on potatoes in Maine.



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Remember, Penco Hi-Gam W-25 comes to you direct from a basic chemical manufacturer with 100 years experience. You get guaranteed high quality, with speedy delivery from nearby warehouses. And our technical representatives are always at your service. Write for further information to: Agricultural Chemicals Division, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.; Tacoma, Washington; Bryan, Texas; Los Angeles, Calif.; and Portland, Oregon.

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AGRICULTURAL CHEMICALS

Technical Briefs

Fertilizer on Vegetables

A study was made to determine the effect of different amounts and combinations of nitrogen, phosphoric acid and potash on the yield of commercial sweet potatoes grown on Bowie fine sandy loam soil in Nacogdoches county, Texas.

Results secured during this one year indicate the following points of significance: The unfertilized plots produced 169 bushels of sweet potatoes per acre with poor vine growth. Over one-third of the total yield was graded as culls.

The average yield from plots which received phosphoric acid and potash but no nitrogen was 204 bushels per acre; from those which received nitrogen and phosphoric acid but no potash, 196 bushels per acre; and from those which received nitrogen and potash but no phosphoric acid, 187 bushels per acre. Vine growth was poor, good and fair, respectively.

A fertilizer treatment which provided 40 pounds of nitrogen, 80 pounds of phosphoric acid and 40 pounds of potash, which is equivalent to 800 pounds per acre of the widely used 5-10-5 grade, produced 266 bushels per acre (107 bushels of culls) with good vine growth.

The best fertilizer used in this test was a combination of 40 pounds of nitrogen, 80 pounds of phosphoric acid and 80 pounds of potash, which is equivalent to 1,000 pounds of 4-8-8 or 800 pounds of 5-10-10 per acre. This combination produced 316 bushels per acre (73 bushels of culls) with excellent vine growth.

—H. C. Hutson and J. C. Smith, in Texas Agricultural Experiment Station Progress Report 1233.

Peach Taste Unaffected

Peaches were sprayed five times during the season with different combinations of spray materials which included parathion, chlordane, acid lead arsenate, benzene hexachloride (two applications only), sulfur and

phygon. Unsprayed trees were left as a check.

Taste tests were made on fresh and canned peaches and data were analyzed statistically. The results indicated there were significant differences in the flavor of some of the peaches receiving different treatments, but the differences were considered to be so small they would not influence the consumer in purchasing peaches.

—Clyde F. Smith, Ivan D. Jones and Lyle D. Calvin, North Carolina Agricultural Experiment Station, in *Journal of Economic Entomology*, April, 1950.

Salt as Weed Killer?

Investigators at the Geneva, N. Y., agricultural experiment station have been gathering data on use of salt for weeding canning beets, while at the Wisconsin station, Madison, Wis., salt has been studied as a replacement for potash in fertilizers used on potatoes and canning beets.

Salt spray used for weeding beets, says the Geneva report for 1949, did not affect the stand or yield. The solution is made by dissolving 2 lbs. salt per gallon of water. For those desiring to add nitrogen to the beet crop, 1.6 lbs. of salt, plus 1.2 lbs. sodium nitrate may be dissolved in one gallon water, the report states. Either of these salt sprays applied to the rows, at 200 gallons per acre, gave good weed control.

The principal weeds in beet plantings can be controlled with salt, but it was found that two of the most troublesome, lambs' quarters and purslane, are not controlled. Beet seedling will be killed if sprayed before developing at least 3 to 5 true leaves. At other stages of growth beets may wilt for a day or two. The spray should be applied when weeds are small, the report advises. When small, a pressure of 50 lbs. will give good coverage; but on large weeds 100 lbs. pressure does a better job. Two nozzles, preferably of the fan-spray-pat-

tern type are recommended, mounted on the boom to give complete coverage of weeds within a single beet row. Spraying equipment should be raised thoroughly after each use, to prevent rapid corrosion of metal and non-metal parts.

In the Wisconsin potato fertilizing experiments, workers tried replacing potash in the fertilizer with common salt, and it was determined that this can be done if the soil is not low in potash. Yields with the salt were not significantly different from yields when the potash was left out and no salt applied. Since the soil was deficient in available potassium, this was considered to indicate that salt cannot replace the larger part of the potash needed by the potato plant.

The Wisconsin studies of salt as a replacement for potash in fertilizer on canning beets indicated, says the station's report, that it can be done and that salt may increase yields as an "extra" in complete fertilizers.

"A new result in tests of replacing potash with salt," continues the report, "indicates that salt may have an added value. In plots where potash was removed from the fertilizer and no salt added, yields fell off. Adding sodium in salt to substitute for potassium increased yields. Adding salt, in addition to the complete fertilizer, gave the best yields of all—about one-third more than any other treatment. The complete treatment for the best yields was 200 lbs. of 3-12-12, plus 20 lbs. of borax in the row; and 800 lbs. of 6-6-18, plus 500 lbs. of salt broadcast. Comparison of results with different fertilizers shows that the beets need a considerable amount of nitrogen, as well as potash."

Tests for Dusts & Sprays

Dr. R. W. Leukel, cereal pathologist of the U. S. Department of Agriculture, Plant Industry Station, Beltsville, Md., points out some of the factors involved in developing satisfactory fungicides. In recent comments on the poison-dusting of seed grains, he says that a disease-control chemical has to meet many standards in addition to the primary one of

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effectiveness against the particular plant disease. He enumerates some of the things that have to be watched.

There must be a margin of safety (because, for one thing, plants and seeds vary in their tolerance); the effect on germination must be known; this sort of knowledge must be extended to stand and yield; the chemical can't be too corrosive on machinery or it will interfere with its operation; it must not have noticeably injurious effects on humans (it should not be even disagreeable to them); then it must be of such nature that it will spread well; it must be so fine that it will stick tight to the seed but it can't be sticky; it must be stable (that is, its chemical composition must not change); and, as nobody will doubt, its final success depends on the cost. In spite of all these requirements, says Leukel, more and more chemicals have come into use for seed and seedling protection.

Control of Corn Borer

Several new insecticides were quite effective in controlling the corn borer in early planted sweet corn. The population of this insect was again low and caused damage only to the earliest planted sweet corn. Although several thousand acres of field corn in Indiana were treated in 1948, few fields had an infestation that would justify treatments. On the other hand, early sweet corn had as high as 90% of the ears infested with either the corn borer larvae or the corn earworm larvae, or both.

Three varieties of sweet corn, Spancross, North Star and Golden Cross Bantam, were planted for insecticide trials on May 1 at Lafayette. The first catch of adult moths was June 2 and a peak of catch on June 11 and 12. Counts of egg masses on the corn revealed a sufficient number of masses by June 15 to apply treatments. Treatments were applied as sprays on a regular five-day schedule of June 15, 20, 25, and 30 even though 2.7 in. of rain fell during this period. At harvest time counts of borers were made by dissecting plants and showed good to excellent control by all materials used. Two forms of DDT, the wettable 50% powder at

2 lbs. in 100 gals. or the 25% emulsion concentrate at 1 qt. in 100 gals., were superior in most comparisons, although DDD and parathion each gave a reduction of 94 or more percent. Methoxychlor gave an 80% reduction and chlordane 83%. Of special interest was the 80% reduction in borers from a single application of DDT on June 20. The corn earworm larvae were specially abundant on the ears of the two early-maturing varieties, Spancross and North Star.

With present low populations of the corn borer insecticide treatments are justified only on early planted sweet corn and perhaps early planted fields of hybrid seed corn. Because of wet soils in early May most field corn was planted after May 20. This delayed planting has been necessary for the past five years and undoubtedly has had an influence on the borer population.

—George E. Gould in Purdue Univ. 62nd Annual Report.

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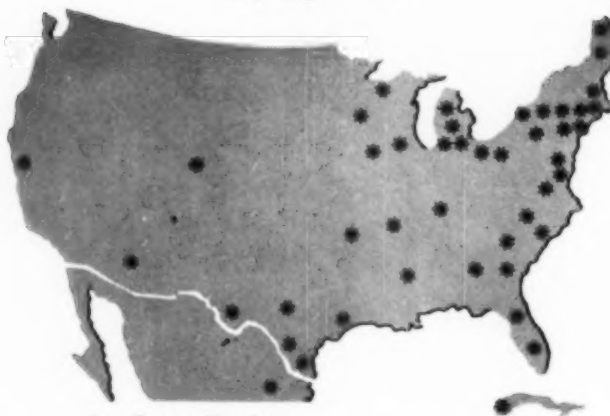
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In Lansing, Michigan . . . two Sprout-Waldron blending systems are each consistently producing 7-10 batches per hour.

Pennsylvania Influence . . . an enviable reputation was built in the first six months of operation. Visiting representatives from Farm Co-ops in other states unanimously characterized the dust as being the finest, most uniform blends they had ever examined.

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"We are greatly pleased with the performance of our Sprout-Waldron system. We believe without a doubt that the dust produced on our equipment surpasses anything else on the market in the South today. Representatives of the producers of the technical toxicants used by us agree with this opinion. We have produced something like 300 tons of Chlordane and Toxaphene field strength dusts this season on the equipment and expect to do at least 400 additional tons. We can imagine no better mechanical principle for the proper mulling of insecticides than the principle of this mill."

Phoenix, Ariz. . .

reports tremendous production rates by the addition of an over-size motor on the blending mill. With a 6-man crew, 8000-9000 lbs./hour are regularly attained. For unexpected demands, peak daily rates averaging nearly 300% of minimum factory rating has been achieved.

In North Carolina . . .

a plant manager reports, "Everyone who visits our plant agrees that we have the most compact, efficient system they have yet seen. Several of the ingredient salesmen have already stopped to take pictures of our Sprout-Waldron blending system."

In Presque Isle, Maine,

a capacity of 6-1000 lbs. batches per hour without interruption was reported. A 4-man crew handled this job using four formula operations and packaging into 50 lb. bags. To meet peak demands during the dust season, levels as high as nine batches per hour are maintained for limited intervals with the same crew. Such peaks exceed the guaranteed factory rating by 125%.

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AGRICULTURAL CHEMICALS

Suppliers' Bulletins

New U. S. I. Booklet Out

U. S. Industrial Chemicals, Inc., New York, has issued a new brochure on CPR-based insecticides. The booklet is designed to inform the user on proper methods of application and is illustrated with numerous photographs showing some of the insect pests at work on leaves of vegetable crops. Field tests data is included along with instructions on application techniques. The "CPR" Booklet is available from the company, 60 E. 42nd St., New York 17.

California Offers Data

California Agricultural Experiment Station, Berkeley, Calif., issued three bulletins in 1949 of interest in the agricultural chemical field. Numbers and titles are as follows: X 157, Selective Weed Killers; X 158, Control of Aquatic and Ditchbank Weeds; B 713, California Greenhouse Pests and Their Control. Another bulletin, No. X 138 deals with "Control of Field Rodents in California."

Fumigant Instructions

American Cyanamid Co., New York, has released a pamphlet on its product "Cyanogas G-Fumigant" describing uses of the material as a grain fumigant. Numerous illustrations are given, along with complete instructions for use. A dosage table, showing the amounts of the product to be used on given quantities of grain completes the brochure. Copies are available from the company, Dept. 32-D, Rockefeller Plaza, New York 20, N. Y.

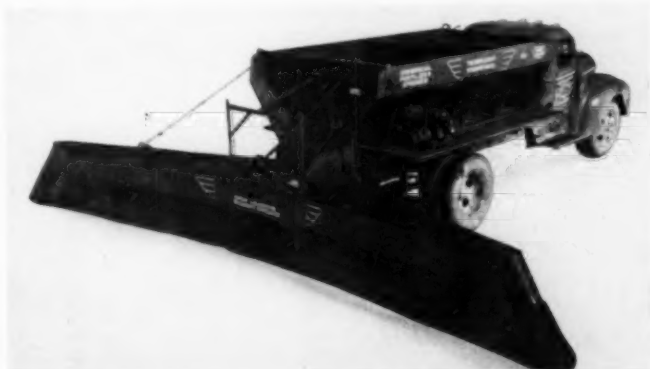
Weed Control Bulletin

"Chemical Control of Weeds in South Dakota" is the title of a new bulletin issued by South Dakota Agricultural Experiment Station, Brookings, S. D. Use and value of the more important herbicides, including 2,4,5-T, TCA, borax, sodium chlorate, the dinitros, IPC and herbicidal oils are

discussed, directions are given on which to use against which weeds, and hazards and precautions explained. Ask for Circular 69 (revised).

Offers New Type Spreader

A new combination commercial fertilizer and lime spreader is being manufactured by Highway Equipment Company, Inc. of Cedar Rapids, Iowa. Notable among the features of the spreader is the sepa-



New spreader manufactured by Highway Equipment, Inc.

rate engine which drives the distributor discs. (See photograph) This method assures full width and uniformity of spread regardless of the speed at which the truck is driven, the company states.

To spread the correct number of pounds per acre, the truck's drive shaft delivers power through a series of V-belts to the conveyor. This feature constantly controls volume of material to the distributor discs at any truck speed, or regardless of soft or hilly field conditions.

The same unit spreads lime as well as commercial fertilizer. In spreading position the slanted and tapered hood controls the material to aid in uniform distribution with a minimum of disturbance from wind. A complete descriptive folder is available from the manufacturer, Cedar Rapids, Iowa.

"Super-Sifter" Announced

Richmond Manufacturing Co., Lockport, N. Y., has issued a bulletin describing its new "Super-Sifter" for separating particle sizes. The unit, suspended from the ceiling, is of the free-swinging type, the makers say. Features of the device include a tubular steel frame, reduced weight to decrease wear of moving parts, easily-removed sieve, and a new quick-acting clamp. Descriptive literature is available from the manufacturer.

Safety Bulletin Issued

Mine Safety Appliance Co., Pittsburgh, has issued a new bulletin describing its new product, the "M-

S-A Farm-Spray Respirator" for protection from parathion fumes. The new device is said to be snug-fitting and light in weight, is fitted with two chemical cartridges and special filters to protect against light concentrations of organic vapors in combination with liquid or solid particles. Copies of the booklet are available from the Mine Safety Appliances Co.

Offers Lab. Catalog

Will Corporation, Rochester, N. Y., distributor of laboratory equipment and supplies, has announced publication of a new catalog. The 902-page book contains more than 12,000 items and sizes. More than 2500 new items have been added, the company states. Persons interested in securing a copy are invited to write, on business letterhead, to Will Corporation, dept. AG, Rochester 3, New York.

Government entomologists predict a heavy infestation of grasshoppers this year. This means a heavy demand for chlordane based insecticides that control the "hoppers". Experienced formulators know that they must service their customers before the "hoppers" begin to migrate. Proper attention at this time results in "hopper" free crop areas and a good profit margin to both farmer and formulator. Chlordane when applied around field margins, roadsides, and fence rows will provide excellent control of this crop ravaging pest and save your customers from ruinous crop loss.

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INDUSTRY NEWS

Kennady Joins Kolker

Kolker Chemical Works, Inc., Newark, N. J., has announced the appointment of John W. Kennady as District Manager with headquarters at the company's Houston, Texas, plant.



JOHN W. KENNADY

Mr. Kennady is a native of Chester County, Pennsylvania and a graduate in Agriculture from Pennsylvania State College. Following his graduation, he was employed by the United States Department of Agriculture. During the war, he served as an aerial gunner in the United States Naval Air Force. In 1947, Mr. Kennady joined the Agricultural Chemicals Division of Pennsylvania Salt Manufacturing Company and was District Sales Manager in Kansas City until June 15.

Del-Mar-Va Fertilizer Meet

"The fertilizer industry holds the future of America in its hands," the Del-Mar-Va Peninsula Fertilizer Association was told at its 26th annual meeting at Ocean City, Md., June 23 & 24. The speaker, Dr. W. R. Thompson, pastures specialist at the Mississippi Agricultural Experiment Station, presented the main address of the two-day session held at the George Washington Hotel. Dr. Thompson's theme, "Pastures Mean Profit" was illustrated with an assortment of props including ten dollar

ills, silver dollars, containers of fertilizer, samples of various types of grasses. Dr. Thompson emphasized to the hundred fertilizer manufacturers, dealers and suppliers that the 434 million acres of pasture land in the U. S. offers a sales potential much larger than the fertilizer industry would be able to supply if plant food were applied to this area in the quantities which it should be. He reminded that pastures save the soil, make it rich, provide the farmer with meat and milk to sell, and in turn, make him money. "You just can't wear out a farm in pastures," he emphasized. "The longer you have pasture land, the better the farm gets."

That fertilizer men should sell the farmer on the basis of assuring the grower a five dollar return for every dollar invested, was pointed out. "Actually, the income is often greater than that," he said.

Governor Elbert N. Carvel of Delaware, president of the Del-Mar-Va Association, presided at the meeting, introducing numerous guests who included control officials from the three states represented, and other visitors from nearby states. In his address of welcome, the Governor reviewed the past year of fertilizer activity in the area, and pointed out the growth made by the industry during the past season.

Fred S. Lodge, representing the National Fertilizer Association, reminded the group that the industry's beginning a hundred years ago took place in the State of Maryland where the meeting was being held, and reviewed briefly the development of the industry during 100 years.

Present officers of the group are to continue. They are: Governor Carvel, president; Ralph A. Rose, Wm. B. Tilghman Co., Salisbury, Md., vice-pres.; Edgar H. McGrath, Farmers and Planters Co., Salisbury, secretary; and Sen. J. Otis McAllister, Dorchester Fertilizer Co., Cambridge, Md., treasurer.

New Wilson & Toomer Head

Wilson and Toomer Fertilizer Co., Jacksonville, Fla., have named Wallace B. Hicks, president of the firm, to succeed J. Albert Woods who recently became president of Commercial Solvents Corp., New York.



WALLACE B. HICKS

Mr. Hicks, a vice-president of the company since 1946, also becomes head of the Florida Agricultural Supply Co., a division of W & T, which manufactures insecticides for agriculture.

The new president is a native of Georgia, and has spent nearly all of his business life in the plant food industry. In 1939, he became affiliated with the Smith-Douglass Co., Inc., at Norfolk, Va., where he was made general superintendent before leaving for Wilson & Toomer in 1942, to take the position of general superintendent of manufacturing operations.

Mr. Woods, his predecessor as president of Wilson & Toomer Fertilizer Company, will continue as a director of the company.

In addition to the main plant and general offices in Jacksonville, Wilson and Toomer also own and operate, as divisions, the Penninsular Fertilizer Works, Tampa, and the Cartledge Fertilizer Co., Cottondale, Florida.

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Manufacturers of Organic Chemicals

Davison Names Three

Dr. Allen T. Cole, formerly chief engineer, has been named manager of the Davison Chemical Corporation's Phosphate Rock Division, to succeed the late William H. Gabeller, it was announced in June by C. F.

which recently was awarded a certificate of safety by the U. S. Bureau of Mines in recognition of a record of one full year without accident.

Dr. Cole joined the Southern Phosphate Corporation in 1944, and since has received various advance-



DR. A. T. COLE

J. W. PAMPLIN

E. C. WEICHEL

Hockley, president of the corporation. At the same time, Edgar C. Weichel, superintendent of operations was given the additional position of assistant manager, and J. W. Pamplin was named chief engineer.

The Phosphate Rock Division, which mines raw material for Davison's extensive fertilizer production, centers at Bartow, Fla. Part of this operation is the Bonney Lake Mine

ments. He is a graduate of Hamline University, St. Paul, Minn., and received his Ph.D. from the University of Florida.

Mr. Weichel received his education in Pittston, Pa., High School and Pennsylvania State College, from which he was graduated in 1932. He has been connected with mining operation since graduating from college.

Court Says "No" To Julius Hyman Appeal

THE United States Supreme Court on May 29, refused to review the case of Julius Hyman, head of Julius Hyman & Co., Denver, Colo., thus making effective the earlier decree of the Superior Court of Cook County (Chicago), Illinois, which was affirmed by the Supreme Court of Illinois. This decree enjoined the Hyman Company from "using or disclosing or permitting others to use the formulas and processes for making chlordane." The Hyman Company is likewise enjoined from making and selling chlordane by decree of the District Court of the City and County of Denver, Colorado.

A statement by Velsicol Corporation, Chicago, plaintiff in the case, says that it has a suit pending in the District Court of the City and County of Denver, Colo. to restrain the Hyman Company, and others, from making and selling aldrin. "The

basis of this suit, like that involving chlordane," the statement explains, "is that the formulas and processes relating to aldrin were discovered in the laboratories of Velsicol Corporation and that Julius Hyman and other former employees of Velsicol Corporation . . . now officers and employees of Julius Hyman & Co. are bound by contract and by confidential relations to assign the inventions to Velsicol Corp."

The Hyman Company, in a statement issued June 5, indicated that although it had discontinued the manufacture and marketing of technical chlordane, attention will now be focused on the technical and sales development of aldrin and dieldrin, "and of the other products now under investigation by our laboratories . . . Aldrin is already in commercial production and is being extensively utilized this season for the control of

cotton insects in the U. S. and of grasshoppers in Canada," the statement says. "Commercial availability of dieldrin is scheduled for this fall, by which time the results of another season's field tests on flies, mosquitoes and many other major pests will have further established the future place of this new chemical . . ." it concludes.

Armour Advances Two



John E. Sanford, president of Armour Fertilizer Works has announced the election of G. Tracy Cunningham (left) and W. E. Shelburne (right) as vice-presidents. Mr. Cunningham is also director of sales.

Mr. Shelburne came to the Atlanta general offices as sales manager in June 1949, before which he had been division manager.

Mr. Cunningham became associated with Armour Fertilizer Works in the Atlanta division where for several years preceding his current promotion he served as assistant general sales manager.

Cotton Meeting Held in Miss.

With principal emphasis on control of weeds and insects in cotton, the 1950 Beltwide Cotton Mechanization Conference was scheduled to be held at Stoneville and Greenville, Miss. July 13-15. Speakers whose names appeared on the advance program included Dr. Frank J. Welch, dean and director of agriculture of Mississippi State College; F. L. Gerdes, U. S. Fiber Lab., Stoneville, Miss.; Dr. Paul J. Talley, agricultural technical advisor, Lion Oil Co., El Dorado, Ark.; and E. D. White, assistant to the Secretary of Agriculture, Washington, D. C.

The second day of the meeting was to feature a practical field demonstration of experimental machines at the Delta Branch Experiment Station.

Fertilizer Groups to Meet

A complete program has been announced for the 26th annual meeting of the National Joint Committee on Fertilizer Application, which is scheduled to be held in Chicago, December 18. The Committee is composed of representatives from six organizations, including the American Societies of Agricultural Engineers; Agronomy; and Horticultural Science; The Farm Equipment Institute; the National Cannery Association; and the National Fertilizer Association.

Scheduled to appear on the program at various times, are Dr. R. M. Salter, chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A.; Glenn A. Cumings, U.S.D.A.; O. C. French, Cornell University; George D. Scarseth, American Farm Research Association; D. R. Dodd, Ohio State University; C. H. Mahoney, National Cannery Association; J. D. Barnard, Minnesota Valley Canning Co.; Proctor W. Gull, Spencer Chemical Co.; Dr. M. H. McVickar, National Fertilizer Association; Maurice H. Lockwood, International Minerals & Chemical Corp.; C. E. Gulle, International Harvester Co.; W. W. Trantor, A. B. Farquhar Co.; and W. A. Hyland, Van Brunt Mfg. Co. General chairman of the meeting will be Dr. A. L. Lang, University of Illinois.

Du Pont Transfers Carlson

Dr. Arne E. Carlson, agricultural specialist with E. I. Du Pont de Nemours & Co., has been transferred from Minneapolis to Cleveland where he will be in charge of field work and investigations in the control of woodland brush and other weed killer activities, for Du Pont's Grasselli Chemicals Department.

3 Victor Appointments

Appointment of James M. Gillet as assistant to the president of Victor Chemical Works, a major producer of phosphates and other industrial chemicals, has been announced by Rothe Weigel, president. Mr. Gillet has been with Victor since 1923, and in recent years has been director of industrial research.

Donald G. Brower, formerly assistant to Mr. Gillet, has been made director of the special products division. Mr. Brower has been a member of the Victor organization since 1932.

Leyman E. Jackson, since 1927 in charge of technical service for the company, has been named director of the food-products division. He joined Victor in 1927.

W&T Man in Fatal Crash

D. L. Evans, Jr., 32, assistant sales manager of the Florida Agricul-

ture Supply Co., a division of Wilson & Toomer Fertilizer Co., Jacksonville, Fla., died May 25 from injuries suffered in a head-on traffic accident near Alma, Ga. His wife and three-year-old son were seriously injured in the crash.

Mr. Wilson had joined the company about a year ago, and was responsible, with Dr. B. R. Fudge, chief horticulturist of the company, for the development of the firm's new insecticide "P-D-Q," containing parathion, DDT and toxaphene.

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Santa Cruz is host to Pacific Slope Entomologists

WITH headquarters at the Casa del Rey hotel, Santa Cruz, Calif., the Pacific Slope Branch of the American Assn. of Economic Entomologists held its 34th annual meeting, June 13-16. H. M. Armitage, Sacramento, chairman of the Branch was in charge of the initial program, which featured talks by C. P. Clausen, A.A.E.E. president, Washington, D. C., and Roy E. Campbell, A.A.E.E. vice-president, Alhambra, Calif.

A paper prepared by Joseph Wilcox and A. F. Howland, U.S.D.A., Alhambra, Calif., reported tests on new insecticides for control of tomato insects in southern California. They stated that DDT and TDE dusts are equally effective in control of tomato fruitworm and have given consistent control. Aldrin and chlordane dusts combined with 5% DDT also gave good control. Dieldrin has shown up well in limited tests, they said. Among the less effective materials were toxaphene, calcium arsenate, DFDT (fluorine analog of DDT), aldrin (alone), methoxychlor, chlor-

dane, cryolite, BHC and lindane used as dusts. "Ryanex" and parathion dusts were comparatively ineffective, but concentrate sprays of DDT gave "excellent" control of tomato fruitworm, and from good to excellent control was obtained with concentrate sprays of toxaphene.

Another paper on the effectiveness of different concentrations of parathion alone and oil with parathion against California red scale, was presented Thursday morning by A. W. Cressman, F. Munger and B. M. Broadbent, U.S.D.A., Whittier, Calif. They said that 2 pounds of 2.5% per 100 gallons was much more effective than one pound against California red scale. Addition of parathion to

oil sprays increased their effectiveness. A light oil and parathion was as effective as medium oil and parathion, they reported.

That houseflies in southern California have become resistant to insecticides other than DDT was March and Robert L. Metcalf, Riverside. Benzene hexachloride and dieldrin were listed as additional toxicants to which insects have developed a degree of immunity.

Satisfactory control of cabbage maggot in 1948 and '49 was reported by Paul M. Eide and Lloyd T. Stitt, Washington State College. Chlordane, aldrin, dieldrin and BHC gave good control, although BHC was sometimes injurious to plants. High gamma BHC was less effective than the technical grade. Control was obtained by dusting, dipping, and adding to a "starter solution." In addition to the formal papers, Dr. Alvin J. Cox reported on the toxicity hearings of the Food and Drug Administration.

Chairmen of the various sessions, in addition to Dr. Armitage, were E. H. Littooy, M. R. Jones, Stanley F. Bailey, H. F. Madson and Laurel G. Smith. The annual banquet was held on Thursday evening, followed by entertainment. The program committee consisted of S. F. Bailey, chairman; E. Gordon Linsley, H. H. Keifer, L. C. Glover, and J. K. Holloway.

Below: Picture of entire Pacific Slope group at Casa del Rey Hotel. Lower photo, left to right: (back row) Ed Littooy, Dr. C. L. Ritchie, Dr. Leslie Smith, Dr. Stanley Bailey and Laurel Smith. (Front row): Roy E. Campbell, Dr. Walter Carter, H. M. Armitage, C. P. Clausen and Dr. A. M. Boyce. Messrs. Bailey, Littooy, Armitage, and Laurel and Leslie Smith are officers of the group for 1950.



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Black Leaf 155—a "fixed" nicotine compound for spraying apples and pears to control codling moth, also for controlling grape berry moth and citrus thrips.

Black Leaf 10 Dust Base—a "free" nicotine compound, easy to mix with non-alkaline carriers to make a neutral dust.

Black Leaf Garden Dust—a multi-purpose dust or spray containing nicotine, pyrethrum and rotenone—plus a concentrated fungicide.

Black Leaf Rotenone Dust—1% rotenone and sulphur, blended on our special carrier material.

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Veg. Growers' Field Day

The New York State Vegetable Growers' Association plans a field day in connection with its annual summer meeting at Cornell University, August 12. Approximately 15 acres will be turned over to machinery exhibits and demonstrations, it has been announced. Many of the machines demonstrated will be applicators for various chemical products.

The field day program will include tours of Cornell demonstration plots and research projects, conservation demonstrations, and talks by Dean W. I. Myers of the College of Agriculture and Walter Pretzer, president of the Vegetable Growers' Association of America.

Chase Bag Names Widlar

J. P. Widlar, manager of Chase Bag Company's Denver, Colorado sales office has been named sales manager of the company's Kansas City Branch territory. The new assignment was announced by R. N. Conners, Chase vice president and general sales manager. Although the Denver sales office activities will continue under Mr. Widlar's supervision, his headquarters will be in Kansas City where Chase has maintained bag manufacturing facilities since 1923.

Wirwille to Pennasalt

Appointment of James W. Wirwille as technical sales representative for Pennsylvania Salt Manufacturing Company's Agricultural Chemicals Department has been announced by Arthur F. Bixby, sales manager of the department.

California Fertilizer Association Presents Awards

CALIFORNIA Fertilizer Association has announced the names of winners in its first annual essay con-

tinue agronomist: Dave Raden, Swift & Co.; Earle Shaw, Chilean Nitrate Sales Corp.; and Howard Hawkins,



CFA Secretary, Elmer S. Nelson, presents trophy to William Hines, Chaffey College. From left to right: Christ Frey;

Hines; Rex W. Wignall, agricultural instructor; Nelson; and Robert Merriam. Photo by Melvin Outlaw.

test, sponsored by the group's Soil Improvement Committee. Seven junior colleges were entered in the contest, with Chaffey College, Ontario, Calif., winning all four places.

Awards were made on June 6 by Elmer S. Nelson, CFA executive secretary and manager. First prize, fifty dollars, went posthumously to Marion Ryan, a reserve Marine officer, who was killed recently in a plane crash. Second, third and fourth prizes (\$25, \$15 and \$10 respectively) were awarded to Christ Frey, William Hines and Robert Merriam.

Judges in the contest were Forrest S. Fullmer, American Potash Insti-

Golden State Plant Food Co. M. E. McCollam, chairman of the CFA Soil Improvement Committee, directed the contest. Subject for the essays was "The Use of Fertilizers."

Hall, New Hyman Vice-Pres.

At a recent meeting of the board of directors of Julius Hyman & Company, Denver, Colorado, J. Newton Hall was elected vice-president in charge of sales and merchandising.

Mr. Hall has been Sales Manager of the Company since it was organized in 1946. Previously he was with the War Production Board.

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BEETS

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SPINACH

Leaf tier

BLUEBERRIES

Blueberry fruit fly

ORNAMENTAL PLANTS

Box elder bug

CUCURBITS

Melon worm
Pickle worm
Squash vine borer

ASPARAGUS

Asparagus beetle

TOMATOES

Flea beetle
Colorado potato beetle
Blister beetle
Potato aphid

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Westvaco Adds Furnace

Westvaco Chemical Division of Food Machinery & Chemical Corp., New York, plans to construct a third electric furnace unit for the manufacture of elemental phosphorus at its Pocatello, Idaho, plant, where two phosphorus furnaces are already in operation. Phosphate rock will come from the near-by deposits on the Fort Hall Indian reservation.

New Parathion Plant

A new plant for the production of parathion and several other organic phosphate insecticides is under construction by Pittsburgh Coke & Chemical Company, R. M. Marshall, president, announced recently. The plant will incorporate a new, economical process originally developed by the German chemical concern, Farbenfabriken Bayer. This process has been further improved and engineered to American requirements by the joint efforts of Bayer and Pittsburgh research personnel who have been working together on the project for the past several months. The plant is now under construction and is expected to be in production in the early fall.

In addition to parathion, one of the several products to be manufactured in the new plant is a systemic insecticide. Preliminary tests indicate great promise for this new type insecticide both as to ease of application and insecticidal results.

Clemson Fertilizer Meet

Clemson College, Clemson, S. Carolina, was to be the scene of a fertilizer conference July 12 and 13, according to Dr. B. D. Cloaninger, head of the school's department of fertilizer inspection and analysis, who was to preside at the initial session on Wednesday morning. Speakers whose names appeared on the advance program included Dr. R. F. Poole, president of Clemson college; J. L. Nichols, Sumpter, S. C.; D. W. Watkins, Clemson; Clifton A. Woodrum, president of the American Plant Food Council, Washington, D. C.; Dr. W. R. Paden, Clemson; Dr. W. C. King, Clemson; and H. A. Woodlee.

On Thursday, the program

called for talks by Fred S. Lodge, assistant to the president, National Fertilizer Association, Washington, D. C.; T. C. Maurer, Spartanburg, S. C.;

C. W. Pennington, Anderson, S. C.; Dr. M. D. Farrar, Columbia, S. C., Chairman of this session was W. E. Gore, Columbia, S. C.

The final session on Thursday was presided over by D. W. Watkins, director of the S. C. Extension Service, Clemson.

MEETINGS

South Carolina Fertilizer Conference, Clemson College, Clemson, S. C., July 12 & 13.

Washington State Fertilizer Conference, Pullman, Washington, July 17 & 18.

National Shade Tree Conference, Syracuse, N. Y., Aug. 21-25.

National Agricultural Chemicals Association, Essex & Sussex Hotel, Spring Lake, N. J., September 6, 7 & 8.

California Fertilizer Association, Coronado Hotel, San Diego, Calif., November 2-4.

N. Y. State Insecticide & Fungicide Conference, Ithaca, N. Y., November, 14-16.

North Central Weed Control Conference, Milwaukee, Wisconsin, December 12-14.

American Association of Economic Entomologists, Denver, Colorado, Dec. 18-21.

Nat'l Shade Tree Meeting

August 21 to 25 are the dates set for the 26th annual meeting of the National Shade Tree Conference, to be held at the Syracuse Hotel, Syracuse, N. Y. Although the program had not yet been announced at press time, the committee under the direction of W. R. Hermann, Empire State Tree Expert Co., Syracuse, was making final arrangements. Dr. Roy R. Hirt, Department of Forestry, Syracuse University, is president of the Conference, and L. C. Chadwick, Department of Horticulture, Ohio State University, Columbus, is secretary-treasurer.

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Kessler to A&S

Arkell & Smiths, multiwall paper bag manufacturers, have announced the appointment of Mr. R. P. Kessler as Packaging Engineer. Mr.



R. P. KESSLER

Kessler, a member of the Paper Shipping Sack Manufacturers Association Technical Committee, makes his headquarters at Canajoharie, New York, and will be in charge of the A&S Packaging Laboratories there.

INSECTICIDE INVESTIGATION?

The National Agricultural Chemicals Association will cooperate with the House Committee authorized by passage on June 20 of the Sabbath Resolution, HR 323, it has been announced. It is expected that the committee authorized by the resolution will be appointed shortly. The resolution authorizes the formation of a committee composed of seven members of the House, appointed by the Speaker, "to direct and conduct a full and complete investigation and study of the use of various chemicals and compounds in the production, processing, preparation and packaging of food products."

The committee's activities are scheduled to consist of three phases, one of which will be insecticides and related materials. The NAC will cooperate with the committee in providing such information and data as may be available, according to Lea S. Hitchner, executive secretary of the Association.

Korean Fertilizer Plant

A plant with a capacity of 100,000 tons of contained nitrogen annually is expected to be built in the Samchok area of South Korea to relieve the area of its dependence on outside sources for much of its fertilizers. The Economic Cooperation Administration has approved of the project. Cost of the equipment for the complete steam-powered plant, is esti-

mated at \$13,400,000. North Korea formerly supplied fertilizer for the southern part of the country, but this source is now cut off by Communists.

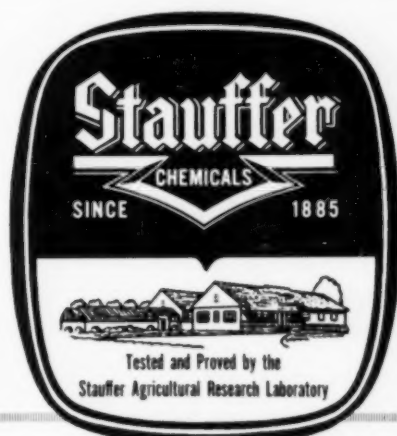
Canadian Fertilizer Meeting

The Plant Food Producers of Canada held their fifth annual convention at Tadoussac, Quebec, June 22-24. Speakers whose names appeared on the program were Dr. J. G. Taggart, Deputy Minister of the Dominion Dept. of Agriculture, Ottawa;

Dr. F. L. Wynd, Michigan State College, E. Lansing, Mich.; Senator A. Godbout; M. Duplessis, Premier for the Province of Quebec; and D. S. Hart, manager of the Agricultural Chemical Division, Canadian Industries, Ltd.

Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C. addressed the group on the final day of the meeting. The annual dinner was held Friday evening, followed by a dance.

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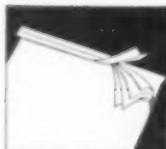
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Corn Borer Article

The Rohm & Haas Reporter for April & May features an article, "You Can't Ignore the Corn Borers." It recommends the use of DDT sprays in the growing of corn as the "backbone of a control program, since the residual characteristics of the insecticide help control the insects as they hatch at different times. The article points out the unusually high value of the corn crops, making extensive control measures sound economically. The Reporter is published by Rohm & Haas Co., Philadelphia 9, Pa.

Beetle Area Expanded

Extensions of the Japanese beetle regulated area to include a number of recently discovered infestations in New York, Ohio, Virginia and West Virginia became effective May 31, the U. S. Department of Agriculture has announced.

At the time infestations were discovered in the added localities, State plant pest officials secured agreements from all commercial nurseries

involved, stating that only beetle-free plant material would be moved from these establishments.

Shell Aldrin Distributor

National distribution of unformulated aldrin and dieldrin will be handled by Shell Chemical Corporation, New York 20, N. Y., it has been announced by the company. Construction of new facilities for manufacturing these insecticides was rushed to completion by Julius Hyman & Co., Denver, Colo., to make aldrin available this season to control cotton insects, and to help prevent a possible short supply of insecticides. Both aldrin and dieldrin are available for large scale use under experimental labels, the manufacturers state.

Jap Beetle Control

In limited tests methoxychlor was as effective as DDT in protecting the fruit and foliage of peaches from attack by the adult Japanese beetle (*Popillia japonica* Newm.), but slight-

ly less effective than DDT in protecting early-ripening apples from injury. Methoxychlor was only one-tenth as toxic as DDT to Japanese beetle grubs in the soil. In view of this low toxicity, it would not be a suitable substitute for DDT in controlling grubs in turf or in nursery and garden soils.

—Walter E. Fleming and W. W. Maines, in USDA Bulletin E-797, April, 1950.

Western Fertilizer Conf.

Washington State College, Pullman, Wash., will be the scene of a two-day conference of fertilizer dealers and manufacturers on July 17 and 18. Sponsored by Washington State College, the meeting will be the first of its kind in the area. Dr. B. Rodney Bertramson, chairman of the WSC Department of Agronomy, reports that representatives are expected to be present from Washington, Idaho, Oregon and British Columbia. Subjects to be discussed include soils and fertilizer research, the extension

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 66 AGRICULTURAL CHEMICALS

soils program, liquid fertilizers and problems of the industry.

Speakers will be Mac C. Taylor, Oregon-Washington Fertilizer Company, Seattle; Dr. J. C. Knott, director of the Institute of Agricultural Sciences, WSC; Sverre N. Ohmdahl, director of the Washington State Department of Agriculture; Mark T. Buchanan, director of the WSC Agricultural Experiment Stations; George Wickstrom, American Potash Institute, Sumner; Wallace Macfarlane, Pacific Guano Company, Berkeley, Calif.; M. E. McCallam, manager, Western States American Potash Institute, San Jose, Calif.; and Dr. Russell Coleman, president, National Fertilizer Association, Washington, D. C.

NEW HAZARDS

(Continued from Page 25)

be enough to kill the luckless individual who got that much on his skin, and left it there for a very few minutes. Fortunately, however, it would seem that the human must be somewhat more resistant to the organic phosphates, since accidents have been reported in which estimated doses above the theoretical limits actually failed to cause death. We know there is a difference in the reactions of different strains of rats to TEPP, so it should be logical to expect that a variation might exist in susceptibility between primates and mice. It would be unwise, however, to count too strongly on humans being more resistant to these poisons in all cases.

With most of the poisons discussed above, toxicity to mammals is an objectionable characteristic, since these products are designed for insect control. Two of the newer compounds, however, are poisons intended fundamentally for control of noxious mammals. Alphanaphthylthiourea (ANTU) is the first of these. This material is one of the most specific substances ever proposed for use. It is extremely toxic to Norway rats and dogs; moderately so to cats, hogs, baby chicks and black rats,—and is practically useless for the control of house and field mice, ground squirrels,

prairie dogs and other pest animals or birds. Fortunately, the human hazards of ANTU are limited, since both tests and use experience have shown that this poison has failed to cause any proved human injury and has a very low toxicity to primates. Sodium fluoroacetate (Compound 1080), however, is entirely different, and as a consequence, its control problems are unique. It is toxic to all forms of life on which it has been tested, and sufficiently dangerous to humans to

deserve the most careful handling which can be devised. Its hazards, moreover, include serious danger of accidental poisoning of beneficial animals through acceptance of carelessly placed baits and from the secondary poisoning danger caused by the lethal material remaining in the bodies of rodents which have died from it. These characteristics caused advisory agencies connected with the discovery and preliminary testing of 1080, to recommend that the manu-

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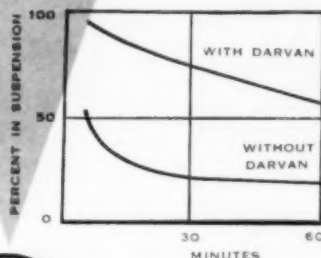
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facturer limit the sale of this poison to responsible persons experienced in handling highly toxic products. This move is unique and its effectiveness is being watched carefully.

The fact that some of the newer and more toxic poisons have proved themselves highly effective against pests, makes the decision as to the degree of control which should be instituted to "adequately protect the public," a very critical one.

There is no easy way to determine just how toxic or potentially

dangerous a substance must be, before its superior effectiveness has to be ignored in order to insure against possible accident. Strychnine, nicotine, phosphorus, the cyanides and the arsenicals are all highly toxic poisons but experience has taught how to use them with caution and, therefore, with reasonable safety. From the acute toxicity viewpoint, it would seem that the present series of "improved" poisons will have about the same order of hazard as the older ones mentioned. The new materials, however,

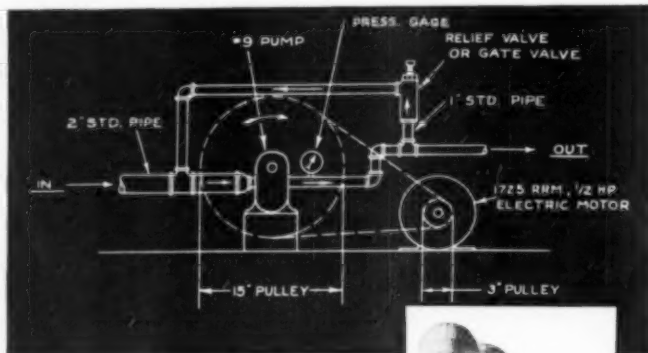
may have obscure factors which may take years of research to disclose.

Many Considerations

BEFORE all of the answers on any poison are available, the hazards from chronic poisoning must be learned, the potentialities for contamination of foods must be studied, the possible detrimental effect on soils from repeated spraying or dusting of crops raised on the land must be determined, and the long-time effectiveness of the product in pest control must be watched. When all of these points are considered, the complexity and the extent of the task are apparent. As a consequence, it may be useful to examine the reasoning back of our present governmental "caution" requirements on the labels for certain of the newer substances.

In discussing these materials it is well to keep in mind that economic poison dangers involve a number of situations:— (a) Hazards to the handler of the formula during the mixing procedures; (b) hazards to the person applying the diluted poison; (c) hazards to the chance visitor to treated areas, due to accidental contact with undissipated residues or uneaten baits; (d) residue hazards on fruit, vegetables, or in meats or dairy products; (e) hazards to beneficial plants and useful insects from careless or ignorant use of insecticides, fungicides and herbicides; (f) danger to pets, domestic animals, and beneficial wildlife from primary or secondary poisoning, following applications for the field control of pest mammals, black flies and mosquitoes.

With that background, it may be easier to visualize just why certain label suggestions are made. As most of you readers know, in the attempt to specify "caution" labeling, economic poison formulations have been segregated arbitrarily, into four general classes. Into the first group go the small number of products which have such low danger that no warning seems justified. Into the next category are grouped those formulas which do not carry serious hazards, but which deserve definite "caution" statements. Then come the products



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which are immediately below the "highly toxic" class. These Formulas usually require warnings similar to those on the "highly toxic" ones, but without the legally specified skull and crossbones, the red word "POISON" and an antidote statement. In the final category are those substances which are "highly toxic" as defined by the Federal regulations, and must carry both adequate warnings and the insignia specified by law.

Important considerations which must always be kept in mind, however, in reviewing labels are:—The size of the package and the potential distribution of the material to inexperienced persons, or its storage where children or pets might have access to it, and "directions for use" which will tend to reduce or increase chances of accidents.

While the staff of the Insecticide Division has no illusions regarding the complete effectiveness of precautionary labeling, it does believe that fully adequate warnings, together with aggressive educational programs and safety campaigns can so improve the handling of strong poisons that danger will be reduced to an irreducible minimum.

Now is not the time to be complacent, however, since much remains to be done. One of the best ways to make progress is to find new poisons which will be equally effective, but less dangerous to health and beneficial forms of life. Another way to reduce accidents with potent poisons is to learn how to use highly toxic materials, and particularly where they should not be employed, and, finally, a great deal of benefit will be derived from an educational program to train operators who have to handle such potent materials, to think "safety" on every job!

This is an active program in which all persons and agencies interested in pest control must cooperate. The fact has been recognized already and much has been accomplished. With conscientious workers in industry joining forces with representatives of Federal agencies, State agencies, and other interested groups, there would be reason for optimism about the solution of any problem.

If any conclusions can be reached from our present knowledge, they would seem to be as follows:

(1) Most of the newer poisons in themselves, are not too dangerous for carefully restricted uses. Some are not suitable for unrestricted sale, since they must be used with a degree of care not appreciated by the public. This means that if sold at all, the distribution must be limited to experts. (2) Some uses which have be-

come well established for certain poisons must be discontinued. (3) Better training, more carefully worded labels, and aggressive safety programs, will help to reduce carelessness and allay apprehension, and will save lives. Finally, it must be emphasized that endless research is the investment which must be made to guarantee progress, and that cooperation is the prime essential in the solution of some of these complex problems.★★

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Decker Discusses Borer

The infestation of the European corn borer is about three to six times as high in Illinois and generally much higher throughout the entire corn belt than it was last year at this time, according to Dr. George Decker, University of Illinois entomologist, who spoke before the recent quarterly meeting of the National Sprayer & Duster Association in Chicago.

As the result of an extensive research program conducted by Dr. Decker and his associates at the Illinois Natural History Survey, a complete borer control program has been adopted in which sprayers and dusters play an important role. This program includes the application of insecticides later in all fields that develop even moderate infestations. The entomologist urged that farmers have their power sprayers or dusters ready for action when the field surveys indicate that treatment is necessary and the borers are most susceptible to kill. This is the critical control period—limited to a few days.

University tests have shown that ground operated equipment provides the most effective and cheapest means of applying the insecticides. The sprayers or dusters must be properly adjusted, however, to place the insecticide where it will kill the borers, according to Dr. Decker.

NFA CONVENTION

(Continued from Page 31)

had none. Widespread interest is seen in the idea, he said, but growers must see the economic desirability of participating. He pointed out that eastern markets for meat are now depending upon sources closer home, which makes a natural setup for southern farmers to raise more cattle.

While it is difficult to get farmers enthused, he said, this has been largely overcome through the offering of prizes to owners of the best pastures, and also through tours of inspection where several hundred persons take part. The trend is toward mass participation, which he termed "the key to success."

Ray L. King, Valdosta, Ga.,

AGRICULTURAL CHEMICALS

chairman of the NFA board of directors, related in his address many of the factors which have helped to develop the chemical fertilizer industry. He pointed out that consumption of fertilizer in 1900 was but 2 million tons, but in 1949, it was nearly 17,000,000 tons; an increase of 650 percent. Factors back of this increase were twofold, Mr. King said. First, an expansion of the number of acres being fertilized as soils of the newer agricultural areas became deficient in one or more plant foods; and second, an increase in per-acre application to expand agricultural production and lower its cost.

Economics Discussed

IN a searching analysis of the present economic environment, Dr. Ralph Robey, chief economist, National Association of Manufacturers, New York, presented a three point address. He said that we need to know where industry is now; what lies immediately ahead, and that industry needs also to know how to handle the problems which lie ahead.

In the first place, he said, wages and prices are now rising again after a period of leveling off. Production of materials and services at present amount to from 260 to 270 billion, as compared to a previous high of 105 billion in 1929, and 90 billion in 1935. Unemployment now, he said, is about as low as it can be expected to go, with about 3 million out of work. This, compared to the 63 million employed, is regarded as a healthy situation.

The picture, however, is clearly one of inflation, he said. The outlook for the remainder of 1950 is for "good business . . . almost roaring business," with prospects for a better year than 1948 which was the highest in history. But the economist warned against too much optimism, pointing out that the trend is definitely inflationary, and that under such conditions, it can "blow up in your face at any time." He pointed out that probable changes are psychological rather than statistical . . . since a switch in public opinion could change the situation quickly. He told the fertilizer industry not to plan on a

down-turning, but at the same time, to be prepared for one.

Looking ahead in a long view, Dr. Robey said, the United States cannot remain prosperous and healthy unless a change is made in the present system of special privilege legislation, brought about by numerous pressure groups. A second factor in the picture is labor, on which the U. S. has no national policy, he said. Although corrective legislation is needed, the thing most urgently neces-

sary is leadership. He pointed out how in too many instances radical elements with foreign ideas and connections gain control and create an atmosphere in which it is impossible for management and labor to meet on common ground.

The fiscal problem is another serious factor. The country is now faced with a fiscal crisis in which the government is collecting some 60 billion dollars a year, and still operating with a deficit of five billion. This

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situation must be corrected, he emphasized. He termed this type of management as "irresponsible, excusable, and inviting disaster." He said that whereas business, before the New Deal, turned back some twenty percent of its income for the purchase of new machinery, expansion programs and the development of new products, this is now impossible due to the Federal Tax setup.

The international situation also drew Dr. Robey's comment that the U. S. cannot buy world leadership any more than a person can purchase the friendship of another individual. At the present rate of spending, the nation will either bankrupt itself or lose its position of leadership . . . or both, he warned.

Planned economy is another factor which is incompatible with the development of a free competitive enterprise, it was stated. He warned that even though the American public is tending toward turning away from planned economy, influential leaders in the capital are "still going on the blueprint line."

The part played by the use of agricultural chemicals in developing agriculture was heralded by Dr. Robert M. Salter, who stated that the scope of the hundred years which he was to discuss, would extend back 50 years and project into the future that far. He pointed out how within the past ten years agricultural research has shown the way to greatly increased production in many crops, and how through the development of chemical weed killers, insecticides, fungicides and hormones, as well as fertilizers, plants have been protected and their yields increased. Looking ahead, he stated that agriculture is on the threshold of many new discoveries which should enhance production even more and give a clearer insight into the use of already known chemicals. He mentioned specifically experiments with hybrids and additional fertilizer materials needed for this stepped-up production.

Dr. Sanders lauded the American farm as the greatest stronghold of democracy, and pointed out that the trend from farm to city is not healthy

for the nation's future. "The farm always has been . . . the seed bed of the nation's population," he declared. Therefore, it should be the nation's responsibility to preserve it. "The farmer cannot continue to spend one-third of his income on feeding, clothing and educating children who are to leave the farm just as they reach productive age." The editor continued by reminding that empty pockets on the farm do not turn the wheels of industry in the cities. "If

the farmer is to maintain the fertility of his soil, he must be able financially to buy plant food, plow under cover crops and lime his land. We must, in the interest of soil saving, maintain an economic atmosphere . . . that will enable the farmer to net a profit."

The annual banquet was held on Tuesday night, with Ray King presenting distinguished guests and acting as master of ceremonies. A program of entertainment was held in the auditorium following the banquet.

Offers Soluble Fertilizer

Raymond C. Crippen Research & Development Laboratories, Baltimore, Md., in cooperation with Miller Chemical & Fertilizer Corp. and the Univ. of Maryland, have developed a new soluble fertilizer, "V.H.P.F." which the makers describe as a nutritive spray which may be applied directly to the leaves and foliage in addition to its use as a fertilizer and side dressing. Tests thus far have been favorable. Literature is available from Raymond C. Crippen Laboratories, Baltimore 2, Md.

Insecticides from Weeds?

Discovery of a new insecticidal chemical has been announced by Avery S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine, USDA, Washington. The material comes from the roots of a common native perennial weed, genus *Helipopsis*, (commonly known as "ox-eye"). Discovery of the new chemical, an amide called scabrin, was made by Martin Jacobson, chemist working under the Research and Marketing Act. Early experimental trials with the new insecticide have indicated it to be appreciably more toxic to houseflies than pyrethrum, long the standard of comparison in laboratory tests.

Aside from chemical properties, the insecticidal toxicity of the new material is the only biological fact known about it so far. How difficult it may be to obtain from the natural weed source, and manufacture it commercially, is not known. The effect of the chemical on insects other than the housefly, or what it does to man or animals, plants or soils, are subjects still to be explored.

There are a number of species of *Helipopsis* in this country, all native to the United States. Three of them have been tested for insecticidal activity so far. Extracts of leaves, stems, bark and roots, have been made, but the extracts from the roots of one of the species, *scabra*, appear to contain the most powerful of the insecticides.

Plants of *scabra* grow on dry soils and along river banks from Maine to British Columbia and New Mexico. They are hardy herbaceous weeds from 2½ to 4½ feet tall, that are related to the sunflowers, *Helianthus*. The flowers produced in fall months are not very attractive and plants are not cultivated for this reason.

New Armour Sticker

Armour & Company, Chicago, has announced production of a sticker for use with insecticides and fungicides. Designated as "Armour Sticker," the new product is said not only to increase the deposit of the pesticide, but also to provide more uniform coverage. Information is available from the company.

Rabbit Repellent Offered

B. F. Goodrich Chemical Co., Cleveland, Ohio, has introduced a new rabbit repellent for gardeners. The new chemical formulation, trademarked "No-Nib!", is packaged in powder form in 6-ounce cans.

New Fertilizer Corp.

The Dixie Liquid Fertilizer Co. has been organized at Laurinburg, N. Carolina, with capital stock of \$100,000. The incorporators were Edwin Pate, D. J. McIntyre and C. E. Beman, all of Laurinburg.

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New Program Announced

Announcing a "Significant forward step on behalf of the industry and agriculture," Dr. Russell Coleman, president of the National Fertilizer Association told the group at its recent summer convention at White Sulphur Springs, W. Va., that the board of directors had authorized the formation of "The NFA Educational and Research Foundation".

The new project was described as an effort to enlarge support in securing and disseminating additional information on the proper utilization of plant food, either as separate materials or as mixed fertilizers; the restoration of depleted soils; and to make agricultural production more efficient. The formation of the new foundation was also expected to place the fertilizer industry in a better position to produce and distribute most economically for the benefit of the nation's economy.

Problems facing the industry which need attention and which the new foundation is expected to help solve, include a determination of the potential fertilizer market in various regions of the U. S., Dr. Coleman pointed out.

New NFA Booklet

The National Fertilizer Association, Washington, D. C., has recently published a new multi-colored book, "Your Future's in the Bag", profusely illustrated with photographs, drawings, graphs and tables to depict the activity of the fertilizer industry over the past century and its current work.

Various processes for the manufacture of Nitrogen and the sources of potash and phosphate are portrayed with cartoons and colored graphs, with ample explanatory copy accompanying the pictures. Copies are available for 15c each, the NFA states.

To New Spencer Position

Spencer Chemical Co., Kansas City, has announced that John L. Sanders, formerly Iowa sales representative with headquarters in Des Moines, has been made southeastern

salesmanager. Mr. Sanders will supervise sales in Alabama, Georgia, Florida and South Carolina from his office in Atlanta. The appointment was effective July 1. Mr. Sanders has been in Iowa for 3½ years, and has been with Spencer since 1946.

Cal. Spray Widens Research

The California Spray-Chemical Corp. has just announced an expansion program for laboratory and

field research on agricultural pest control chemicals for 1950 and 1951. New field laboratories have been established at Janesville, Wisconsin; Uvalde, Texas, and Orlando, Florida.

Offers Polyethylene Bags

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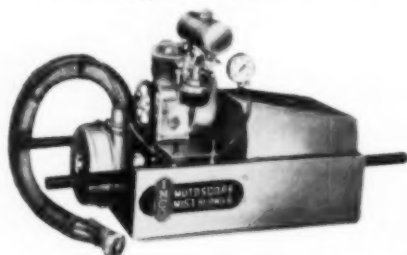
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PENNSYLVANIA

S. D. Recommends Slurry

Advantages of the "slurry" treatment for small grains, flax, corn and sorghum are stressed in a new bulletin by C. M. Nagel, of the South Dakota Agricultural Experiment Station.

Dr. Nagel points out that the slurry method virtually eliminates the dust hazard to workers in seed-treating operations. He advises treating at least a week or two before planting, or longer where practical.

Wheat bunt has been on the increase in South Dakota during the past five years, and in 1948 caused yield losses up to 33 per cent. Proper seed treatment can be expected to control this disease 100 per cent.

Beg Pardon

Through an error, the name of John W. Zukel as author, was omitted from his article on Maleic Hydrazide as a plant inhibitor, in the May issue. We regret this omission, and apologize both to Mr. Zukel and to the Naugatuck Division of U. S.

Rubber Co., in whose laboratories the experiments were made.

LISTENING POST

(Continued from Page 41)

emergence. Blue mold, although prevalent in untreated beds, did not seem to be the chief cause of generally poor stands.

On April 14th blue mold was found in Halifax County, Virginia. At the end of April in Virginia tobacco plants were good, although small, and two weeks later than usual. A big increase in the amount of "Ferham" used was noted, applied much more thoroughly than in the past. By May 5th, following ideal conditions for disease development, blue mold was generally distributed throughout the whole blue-cured area of Virginia. Toward the end of May the plant situation was excellent in Virginia, with one-half of the acreage already in the field. Farmers in all counties were "jubilant" over the results of the blue mold control program. Many

farmers stated that this year's plants were the best in ten years. It is estimated that 75 to 90% used "Ferham," spraying or dusting more thoroughly than in previous years.

On May 1st blue mold appeared in Tennessee in beds in protected areas in or near woods where soils had maintained adequate moisture to support normal growth of plants during the prolonged dry spell. Later, it became quite extensive throughout the State.

On May 4th blue mold was present in two counties in Maryland and by the end of May had spread rapidly throughout southern Maryland. There were marked differences between sprayed and unsprayed beds. By the end of May, blue mold was present in about six counties in Kentucky but no serious outbreak occurred.

In conclusion, it seems there are several fungicides available which will give effective control of blue mold if they are properly applied and at the right time.



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For cattle grub control, rotenone is the only material recommended by the Bureau of Entomology and Plant Quarantine. It is extremely effective for this use and has been used extensively for several years. Its safety in use is of prime importance in this field.

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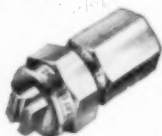
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| SPERGON-DDT-SL: | Dry wettable powder for slurry seed treatment. |



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NAUGATUCK

CONNECTICUT

Industry Patents

2,510,366. RODENT REPELLENT. Patent issued June 6, to L. I. Baumgartner, Yonkers, N. Y., assignor to B. F. Goodrich Co., New York. A rodent repellent composition which comprises as the essential active ingredient 0.5% to 10% by weight of beta-isothioureidopropionic acid and as a carrier therefor an aqueous medium in which said active ingredient is uniformly dispersed.

2,510,367. RODENT AND DEER REPELLENTS. Patent issued June 6, to L. I. Baumgartner, Yonkers, N. Y., assignor to B. F. Goodrich Co., New York. A rodent and deer repellent composition comprising an active repelling agent dispersed in an aqueous solution of a dispersing agent, said active repelling agent being present in an amount from 6 to 25% by weight and consisting of the oily product of the reaction of three molecular equivalents of butyraldehyde with one molecular equivalent of aniline, said oily product having a brown to red color and an index of refraction of about 1.575.

2,510,431. INSECTICIDAL COMPOSITION COMPRISING A DODECAHYDRO ACRIDANE. Patent issued June 6, 1950, to W. D. Stewart and John H. Standen, Yonkers, N. Y., assignors to B. F. Goodrich Co., New York. A dust composition toxic to fleas which comprises 0.1% to 10% by weight of a methyl dodecahydro acridane as the essential active ingredient and a pulverulent solid as a carrier therefor.

2,510,696. FUNGICIDAL COMPOSITION COMPRISING A 4,5-PYRAZOLEDIONE-4-OXIME. Patent issued June 6, 1950, to B. A. Hunter and N. K. Sundholm, Naugatuck, Conn., assignors to U. S. Rubber Co., New York. A fungicidal composition comprising an aqueous suspension of a 4,5-pyrazoledione-4-oxime, in which the nitrogen in the 1-position is attached to a member of the group consisting of hydrogen and aryl radicals and the carbon in the 3-position is attached to a member of the group consisting of alkyl and aryl radicals, said aqueous suspension containing a dispersing agent.

2,510,725. FUNGICIDAL COMPOSITION COMPRISING A 3-PHENYL-2,4-THIAZOLEDIONE. Patent issued June 6, to N. K. Sundholm, Naugatuck, Conn., and Joseph B. Skaptason, Hempstead, N. Y., assignors to U. S. Rubber Co., New York. A fungicidal composition comprising an aqueous suspension of a 3-phenyl-2,4-thiazoledione, said aqueous suspension containing a dispersing agent.

2,510,839. HERBICIDAL COMPOSITION. Patent issued June 6, to A. J. Schmidt, Houston, Tex., assignor, by mesne assignments, to Standard Oil Development Co., Elizabeth, N. J. An improved herbicidal composition which comprises from 10% to 90% by weight of 2,4-dichlorophenoxy-

acetic acid, the remainder of the composition being a vehicle for the 2,4-dichlorophenoxyacetic acid, said vehicle containing an aliphatic alcohol in an amount in the range between 40% and 95% by weight of the vehicle, cyclohexylamine sulfonate in an amount in the range between 1% and 20% by weight of the vehicle, alkali metal sulfonate in the range between 2% and 20% by weight of the vehicle, and a viscous hydrocarbon binding agent having a Saybolt Universal viscosity at 100° F. above 1,000 seconds in an amount in the range between 1% and 10% by weight of the vehicle.

2,510,870. INSECTICIDAL COMPOSITION. Comprising 1,1-di-(4-chlorophenyl)-2,2,2-trichloro-ethane and 1,1-di-(monochlorophenyl)-ethane. Patent issued June 6, to C. E. Dieter and B. J. Theigs, Midland, Mich., assignors to Dow Chemical Co., Midland, Mich. An insecticidal composition comprising as active toxicants 1,1-di-(4-chlorophenyl)-2,2,2-trichloro-ethane and 1,1-di-(monochlorophenyl)-ethane, and wherein the mixture of toxicants exerts a synergistic effect as regards insecticidal toxicity.

Trade Mark Applications

ROACHMASTER. in small capital letters for liquid chemical composition for use as an insecticide. Filed Jan. 9, 1947, by Michigan Chemical Corp., Saint Louis, Mich. Claims use since Dec. 4, 1946.

TA-ANT. in capital letters, for ant poison. Filed Mar. 25, 1949, by Fleming Rug Co., Inc., Elkhorn, Wis. Claims use since Feb. 9, 1949.

WARE-O-CIDE. in capital letters, for insecticides. Filed Apr. 26, 1949, by Midland Laboratories, Dubuque, Iowa. Claims use since Mar. 11, 1949.

PHOSFUME. in capital letters, for insecticide. Filed May 23, 1949, by Thompson-Hayward Chemical Co., Kansas City, Mo. Claims use since Apr. 12, 1949.

O-CEDAR. in capitals and lower case, for insecticides. Filed July 24, 1947, by O-Cedar Corp., Chicago. Claims use since June 1, 1907.

DNACIDE. in italic capital letters, with shaded portion over the letters, for insecticides and fungicides. Filed Dec. 3, 1948, by Wm. H. Stueh & Co., Inc., Teaneck, N. J. Claims use since Nov. 1948.

DRAWING OF MOUNTAIN WITHIN RECTANGULAR FRAME, for copper sulfate. Filed Aug. 6, 1949, by Mountain Copper Co., Ltd., London, England. Claims use since 1932.

OCTALOX. in capital letters, for insecticides. Filed Aug. 19, 1949, by Julius Hyman & Co., Denver, Colo. Claims use since July 22, 1949.

LAWN CARE. in capital letters, for fertilizers for the lawn & lawns. Filed June 22, 1948, by O. M. Scott & Sons

Co., Marysville, Ohio. Claims use since July, 1946.

CROSS COUNTRY. in script type, for fertilizers; namely, sheep and cow manure, bulb food, evergreen food, rose food, bone meal, sulfate of ammonia, liquid plant food, peat manure. Filed Dec. 16, 1948, by Sears, Roebuck & Co., Chicago. Claims use since Apr. 1, 1948.

SUL-AMMO. in heavy capital letters, for liquid ammonium bisulfite generally utilized as a fertilizer and soil conditioner. Filed Jan. 21, 1949, by Stauffer Chemical Co., San Francisco, Calif. Claims use since Jan. 1949.

TO ATOTONE. in Capitals and small capitals, for synthetic plants hormones (plant stimulant) Filed Mar. 2, 1949, by American Chemical Paint Co., Ambler, Pa. Claims use since Feb. 2, 1949.

VISTAGREEN. in capital letters, for fertilizer. Filed Mar. 4, 1949, by Armour & Co., Chicago, Ill. Claims use since Feb. 3, 1949.

ARMOGREEN. in capital letters, for fertilizer. Filed Mar. 14, 1949, by Armour & Co., Chicago, Ill. Claims use since Feb. 9, 1949.

DRAWING OF FOUR HORIZONTAL PARALLEL LINES WITH SMALL CIRCLE AT CENTER, for potash used as fertilizer. Filed May 9, 1949, by U. S. Potash Co., New York. Claims use since July 2, 1945.

KAPOST. in capital letters, slanted upwards, with long accent over letter "a", for organic compost. Filed Sept. 26, 1949, by Alma S. Kalin, doing business as Kalin Compost Co., Cleveland, Ohio. Claims use since June 10, 1949.

ROSE VALLEY. in stencil capital letters, for enriched fertilizer top soil used as a plant food. Filed No. 29, 1949, by Grocery Store Products Co., New York. Claims use since June 1949.

VITAMURE. in capital letters, for plant manures and fertilizers. Filed Oct. 24, 1947, by Alexander Products, Ltd., Bristol, Eng. British registration claimed since 1938.

WHITE HOUSE. in capital letters, for plant and lawn foods and garden fertilizers. Filed Mar. 27, 1948, by The Cusins and Fearn Co., Columbus, Ohio. Claims use since Apr. 1, 1920.

SASCO PHOS. in hand-lettered caps, arranged within oval, for fertilizers used as plant food for field crops and pasture grasses and legumes. Filed Mar. 26, 1949, by Southern Acid and Sulfur Co., Inc., St. Louis. Assignor to Mathieson Chemical Corp., New York. Claims use since Sept. 21, 1946.

ROSETONE. in heavy capital letters, for plant stimulant. Filed Feb. 3, 1949, by American Chemical Paint Co., Ambler, Pa. Claims use since Jan. 4, 1949.

KAYLORITE. in small capital letters, reading upward, for fertilizers. Filed Nov. 23, 1949, by Harry W. Kaylor, Dunkirk, Md. Claims use since Feb. 20, 1947.

FMG. in shaded hand-lettered capitals enclosed in shield, for fertilizers. Filed Dec. 15, 1948, by Frank Kouril, Jr., doing business as Frank's Market Garden, Springfield, Mass. Claims use since Dec. 8, 1948.

Classified Advertising

Rates for classified advertisements are ten cents per word, \$2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, \$1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 25th of preceding month.

Positions Open:

Field Representative: Agricultural chemical sales for large reputable manufacturer of basic insecticides. Degree in entomology, biology or equivalent experimental station or other experience required. Midwest territory. Address Box No. 446, care of Agricultural Chemicals.

Nationally Known U. S. Chemical Firm seeks man experienced in sugar cane to handle sales development work in Cuba on herbicides. Preferably some background agronomy or chemistry plus first hand field experience. Willing to locate extended period in Cuba. Fluent Spanish and some selling experience desirable. Work would involve contacting plantation supervisors, conducting field trials on weed control and training and trouble shooting on field application methods. Please submit qualifications, date available and salary expectation. Address Box No. 447, care of Agricultural Chemicals.

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Responsible Position with a progressive insecticide concern in an administrative capacity desired by aggressive young man. Ten years experience including research, control, cost accounting, blending, grinding, diluents, field work and direct selling. Two years of college including Chemistry, Biology and Entomology. Address Box No. 448, care of Agricultural Chemicals.

Representative: Four years experience selling agricultural chemicals. Young, aggressive. Desires position agricultural chemicals or bag company in Intermountain or Pacific Coast area. Address Box No. 449, care of Agricultural Chemicals.

Sales Representation: Do you want to sell the chemical, chemical specialty, agricultural chemical, soap, detergent, and allied industries in New York Metropolitan territory? Man with 15 years sales experience this area knows the buyers, best references, good sales record, available for new connection. Could do excellent job for out-of-town manufacturer in N. Y. territory where experience and contacts would be valuable. For further details write Box No. 450, care of Agricultural Chemicals.

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Our Fertilizer Plant in Augusta, Ga., now operating is for sale, 10,000 tons capacity. Mark J. Bridges, Mgr., Augusta Fertilizer Works, Augusta, Georgia.

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Lockwood's Father Dies

Henry N. Lockwood, father of Maurice H. Lockwood, former president of the National Fertilizer Association and now a vice-president of International Minerals & Chemical Corp., Chicago, died June 25 at his home in Winnetka, Ill., following a lengthy illness. Burial was made in New Britain, Conn.

Sprout, Waldron Sales Mgr.

Harold J. Alsted has just been named general sales manager for Sprout, Waldron & Co., Muncy, Pa. Mr. Alsted has previously been district sales representative in the Chicago area.

Flower Growers Organize

Commercial flower growers from New Jersey, eastern Pennsylvania and southern New York were scheduled to meet at Rutgers University, New Brunswick, N. J., June 28, to explore the possibility of organizing a commercial flower growers association. Some 250 persons were expected to attend the meeting according to Dr. O. W. Davidson, professor of ornamental horticulture at Rutgers.

AGRICULTURAL CHEMICALS

Koppers Designs Jap Plant

Koppers Company, Inc., has received a contract from Nissin Chemical Company of Osaka, Japan, to do the engineering on a liquid purification plant to remove sulfur from various industrial gases. Work was to start at once and complete engineering plans and drawings were expected to be sent to Japan by August 1.

The Nissin Company specializes in the manufacture of sulfuric acid, synthetic fertilizers, and chemicals related to these manufacturing processes. Details of the contract have been approved by Japanese officials and by American officials in Japan.

New Cornell News Letter

A news letter on insecticides is being sent to New York County Agricultural agents by the Department of Entomology at Cornell University. Although the new periodical is issued at irregular intervals, its subjects are selected to interpret and help keep informed, the county agents. Editor of the News Letter is Dr. R. W. Leiby, Project Leader in Extension Entomology. The new venture will be a supplement to the department's weekly news letter on insects and diseases sent to county agents for the past 31 years.

The first issue contained information on precautions to be observed in handling and using aldrin and insecticides in which it is present, an article on the use of respirators to protect from parathion fumes; and a statement on phosphate insecticides. The issues will be dated, numbered and folioed so that the county agent may develop a folder for future reference on various subjects.

Dow Expands "TCA" Mfg.

Production facilities for the manufacture of "Sodium TCA 90%" have been expanded by the agricultural chemical division of Dow Chemical Co. This expansion program has resulted from a steadily-increasing demand for the perennial and annual grass killer, first used commercially in 1949. W. W. Allen is in charge of sales of the company's agricultural chemical division.

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(The Advertisers' Index has been checked carefully but responsibility can be assumed for any omission)



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AGRICULTURAL CHEMICALS

254 WEST 31st STREET

NEW YORK 1, N. Y.

TALE ENDS

Among the items of "appropriate wearing apparel" seen at the NFA meeting at White Sulphur Springs, were neckties worn by part of the Lion Oil Co. contingent, having as designs, little figures of lions roaming over the area. . . .

A highlight of the meeting was the cutting of the hundredth anniversary cake by Mrs. Ray King at the banquet. The cake, sporting one-hundred lighted candles, was made especially for the occasion, and pieces of it were distributed to the ladies present.

Perfect weather favored the meeting crowd, with golfers taking full advantage of the sunshine, and other sports-minded people occupying the tennis courts, the horseshoe pits, shuffleboards, putting greens, swimming pool and bridle paths.

Fitting tributes were extended to Daniel S. Murph, NFA secretary whose retirement as of August 1 was announced. Ray L. King, chairman of the board, paid particular attention to Judge Murph's devotion to the association and to the fertilizer industry as a whole.

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The Institute of Insect Control, Kyoto University, Kyoto, Japan, publishes technical bulletins on entomological subjects, and favors *Agricultural Chemicals* by sending copies to our editorial offices. Although some of the summaries are printed in English, most of the 60-odd pages are in Japanese characters, which presents quite a challenge to the staff. (So far, we've not mastered them.)

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Paul R. Miller, of the Plant Disease Survey of the Bureau of Plant Industry, and a regular contributor to *Agricultural Chemicals*, is a former 220-yd. low hurdles champ, we learned recently. For five years his Big Ten record in the event stood the test of time, but finally was shaded. His cinder path days were back in the mid-twenties at Purdue.

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